THE Journal

AUGUST

1952

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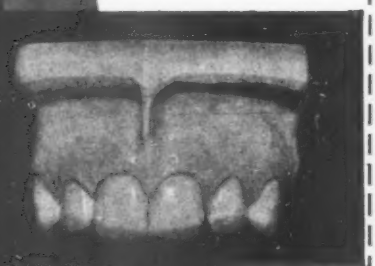

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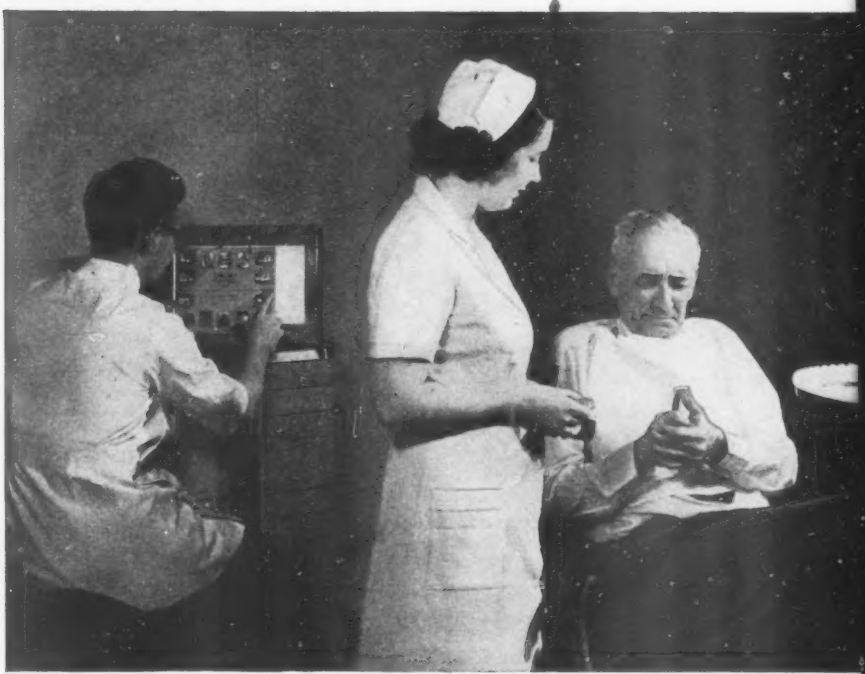

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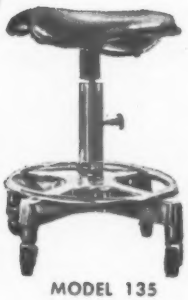

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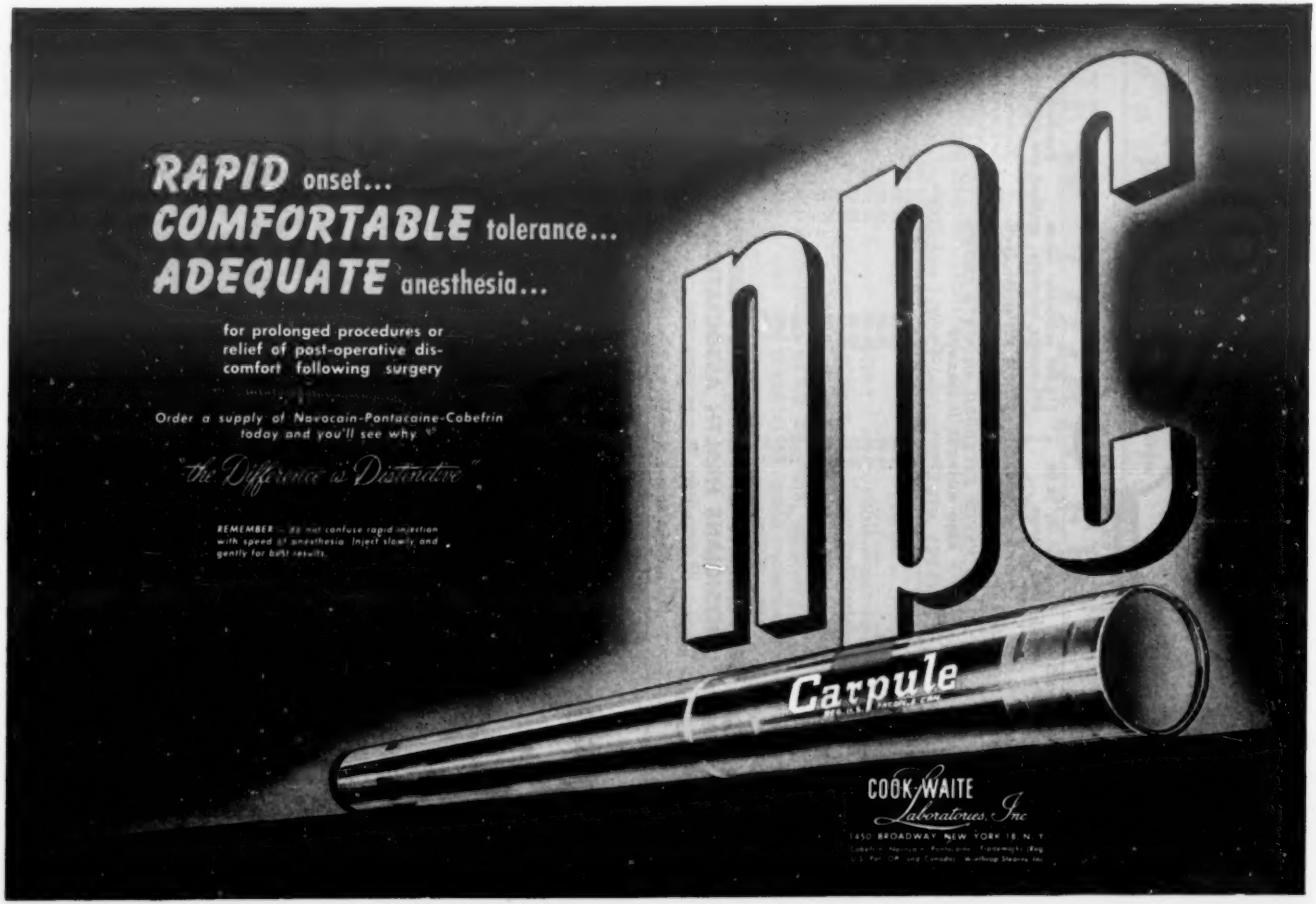
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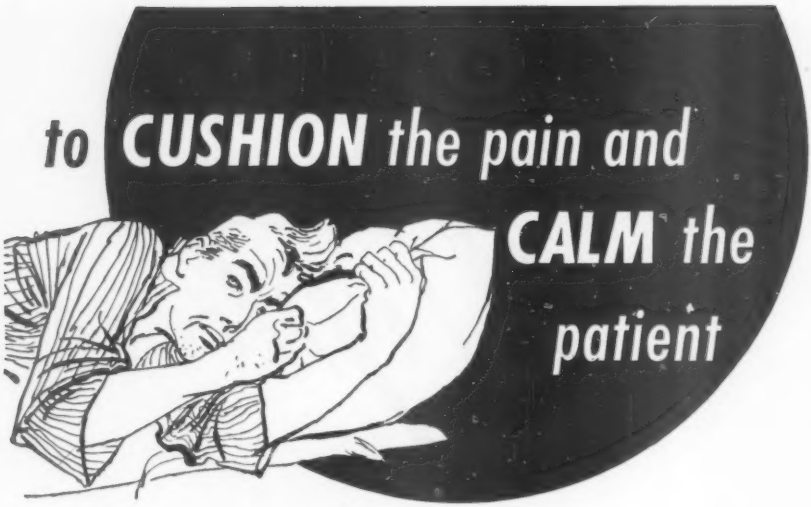

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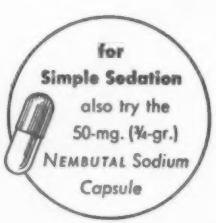

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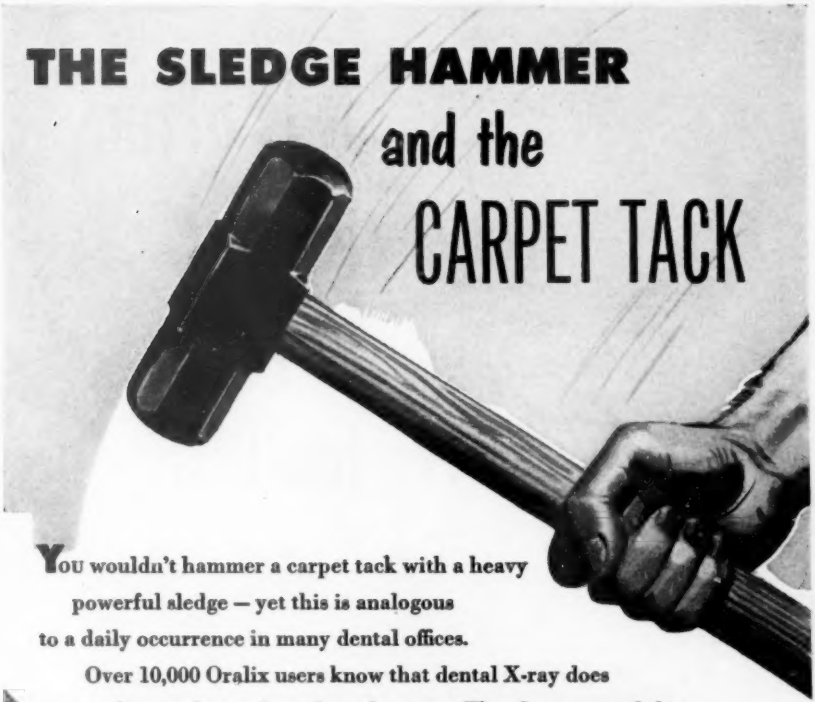

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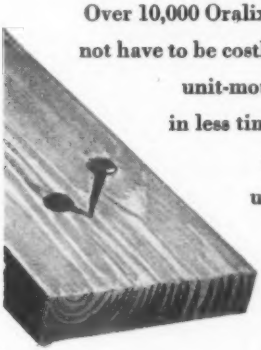

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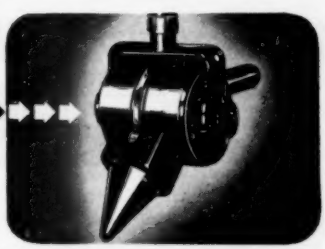

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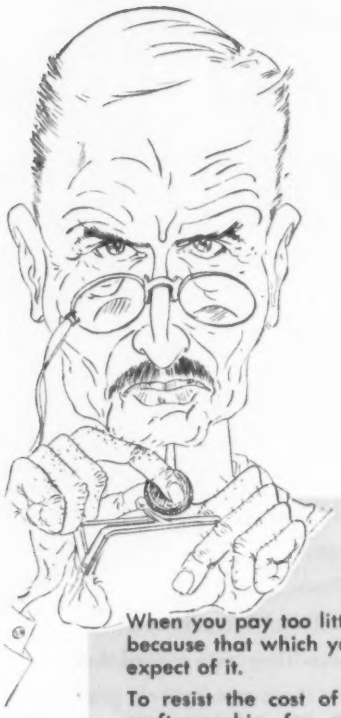

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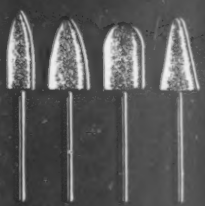

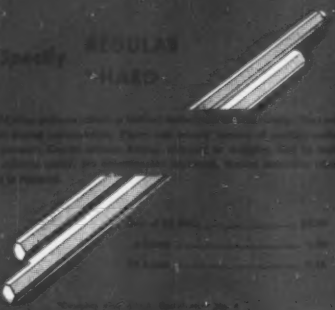

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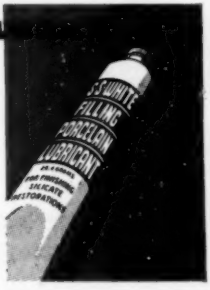

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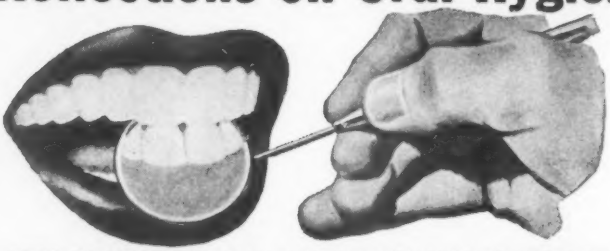

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AUGUST 1952 VOLUME 45 • NUMBER 2

THE Journal

OF THE AMERICAN DENTAL ASSOCIATION

Focal infection in relation to health and disease

John A. Kolmer, M.D., D.P.H., Philadelphia

Even before the days of bacteriology, conditions which today are known as focal infection were recognized by some observers as indicating a relation between local and systemic disease. The modern concept of focal infection, however, began about 50 years ago when Hunter,[1] an English physician, wrote about "oral sepsis" in the etiology of bacterial endocarditis, osteomyelitis, nephritis and other diseases. This was followed in 1911 by his second article[2] in which he stoutly maintained that "oral sepsis" was responsible not only for general ill health but for anemia, chronic rheumatism, nephritis and other systemic diseases. He maintained that oral sepsis embraced caries, ulcerative gingivitis, pyorrhea alveolaris and rarefying osteitis, associated with gold fillings and crowns and bridges on diseased teeth which constituted a "veritable mausoleum of gold over a mass of sepsis." A year later Billings[3] also drew particular attention to various chronic localized foci of infection, designated as focal infection, in relation to the etiology of arthritis, neuritis and subacute and chronic glomerulonephritis. In 1918 in his Lane medical lectures,[4] he listed a larger number of primary acute and chronic localized or focal infections in possible etiologic relationship to these and additional diseases.

Undoubtedly these pioneer clinical and bacteriologic investigations and observations were of benefit both to medicine and dentistry. They were received,

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1. Hunter, W. Oral sepsis as a cause of disease. Brit. M. J. 2:215 (July 28) 1900.

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4. Billings, F. Focal infection: the Lane medical lectures. New York, D. Appleton Co., 1918.

however, with overenthusiasm and were commonly misunderstood and abused. Wholesale extractions of teeth and tonsillectomies were performed because there did not seem to be anything else to do in treatment. Holman,[5] Slocumb and his colleagues,[6] Irons[7] and others have concluded that focal infection as a potential cause of systemic conditions and diseases is no longer a theory but a principle or concept firmly established in both medicine and dentistry. On the other hand, however, many physicians and dentists have questioned the clinical importance of focal infection, especially during the past 10 or 15 years. Few subjects in medicine and dentistry have become more controversial, especially in relation to the etiology of rheumatoid arthritis and allied diseases. Thus Reimann and Havens,[8] and more recently Easlick and his associates,[9] have published extensive and valuable reviews calling attention to difficulties and also to the sources of clinical and bacteriologic errors in the detection of focal or primary foci of infection, especially with regard to the teeth and tonsils. They and others have revived interest in the question of why many individuals with detectable focal infections apparently escape manifestations of ill health (at least temporarily, as originally stated by Hunter) while others develop various conditions and diseases. Also interest in the question of why such conditions and diseases occur in individuals without detectable focal infections. Lack of detectable focal infections does not necessarily mean that the infections may not have been overlooked or have been present in the individual previously. Also, the question arises as to why the extirpation or drainage of focal infections frequently fails therapeutically, although not infrequently there is a general improvement in health. These questions, along with the mechanism of focal infections in the etiology of secondary conditions and diseases, are among the subjects largely responsible for the differences of opinion which will be discussed herewith.

DEFINITION OF FOCAL INFECTION

A focal infection may be defined as any primary source of infection in etiologic relationship to a secondary systemic condition or disease. The primary source usually is a focus of infection but such a focus is not necessarily required for establishing a secondary disease. Subacute bacterial endocarditis, for example, is due sometimes to infection with alpha streptococci (*Enterococcus*) from an apparently normal gastrointestinal tract. It is both possible and probable that other potentially pathogenic microorganisms on the buccopharyngeal and other normal mucous membranes may gain access to the lymph and blood resulting in the production of secondary diseases in other parts of the body.

Billings has defined "a focus of infection as a circumscribed area of tissue infected with pathogenic organisms" but the focus may be diffuse instead of circumscribed, as in nasopharyngitis and gingivostomatitis. It is not necessarily true that secondary diseases are due to the hematogenous dissemination of pathogenic microorganisms or their products from focal infections. Some of them may be due to direct mucosal continuity or extension as in the etiology of tracheitis, bronchitis, intrinsic asthma, acquired bronchiectasis and other pulmonary infections resulting from the postnasal drip of paranasal accessory sinusitis or the

5. Holman, W. L. Focal infection and "elective localization." Arch. Path. & Lab. Med. 5:68 (Jan.) 1928.

6. Slocumb, C. H., and others. Focal infection. J.A.M.A. 117:2161 (Dec. 20) 1941.

7. Irons, E. E. The theory of focal infection: its influence on the practice of medicine. Proc. Inst. Med. Chicago, 16:265 (Dec. 15) 1946.

8. Reimann, H. A., and Havens, W. P. Focal infection and systemic disease; a clinical appraisal. J.A.M.A. 114:1 (Jan. 6) 1940.

9. An evaluation of the effect of dental foci of infection on health. J.A.D.A. 42:609 (June) 1951.

inflammatory exudates of tonsillitis, periodontitis or suppurative gingivitis.

LIVING AGENTS OF FOCAL INFECTION

The pathogenic bacteria are of most importance among the living agents of disease in relation to focal infection. Among these the streptococci, with special reference to beta and alpha or viridans streptococci, and coagulase-positive staphylococci are of most importance. They also include gamma streptococci, pneumococci, gonococci, meningococci, *Klebsiella pneumoniae,* tubercle bacilli, coliform bacilli, salmonella with special reference to *Salmonella typhosa* and *S. choleraesuis, Hemophilus influenzae, Pseudomonas aeruginosa, Proteus vulgaris,* and possibly a few additional species.

To my knowledge, however, none of the pathogenic spirochetes are involved except, possibly, *Treponema pallidum* in syphilis. In syphilis, infections secondary to established primary foci may occur during periods of transient spirochetemia. Likewise pulmonary spirochetosis due to *T. vincentii, T. microdentium, T. macrodentium* or other spirochetes, is secondary to primary infections of the mouth or the throat. The rickettsiae are of little or no importance since complications, like the iritis of Rocky Mountain spotted fever, are apparently part of the natural course of the disease. In viral diseases such as the common cold, influenza or measles, secondary bacterial infections (sinusitis, otitis media or pneumonia) may occur. There also may be secondary bacterial infections of the skin lesions in smallpox, chickenpox and herpes, although these do not fall within the category of focal infections. Some of the pathogenic fungi, however, may be responsible, as in meningitis secondary to primary infections of the lungs due to *Cryptococcus neoformans,* infections of the skin, bones, joints and meninges secondary to primary infections of the lungs due to *Coccidioides immitis* and gastrointestinal and respiratory tract infections secondary to primary oral moniliasis due to *Candida albicans.* Apparently the only animal parasite involved in focal infection is *Endameba histolytica* which causes a primary amebic enteritis or dysentery with a secondary amebic hepatitis or abscess and brain abscess.

POTENTIAL FOCAL INFECTIONS

Theoretically any primary source of infection may be a possible or potential focal infection. In most instances these primary sources are acute or chronic, diffuse or circumscribed foci of infection. Those subject to movement or compression or both, which enhance the hematogenous and lymphogenous distribution of microorganisms or their products, are of most importance especially in reference to dental, tonsillar, prostatic, seminal vesicular, endocervical, nasal sinus and gastrointestinal infections. A primary focus may be an area in which microorganisms from other parts of the body may localize. This is especially true in periapical regions and dental pulps because of the anachoretic effects of inflammatory tissues.[10]

Dental Foci • Primary dental infections include not only gingivitis and gingivostomatitis but pulpitis and infected root canals. Painful vital but infected pulps, periodontal infections (with special reference to periodontitis, alveolar abscess, apical and periapical infections), infected impacted teeth (especially the third molars), retained infected roots, residual infections of bone after extractions, infected cysts, osteomyelitis of the jaws and infected salivary calculi are included as well. Cementomas are of no significance since they are due to anomalies in development rather than to infection. The

10. Burket, L. W. Oral medicine, ed. 2. Philadelphia, J. B. Lippincott Co., 1952, p. 421.

same is true of pulp nodules or denticles which apparently result from physiologic changes in pulps. Furthermore, completely impacted teeth are not likely to be infected and the same is true usually of the fractured roots of anterior teeth since they escape exposure to the saliva or other sources of infection. Clinical experience has shown, however, that infections of deciduous teeth are just as important as those of the permanent teeth from the standpoint of possible focal infections.

In 1936 Grossman[11] reported 42 per cent positive cultures in treated root canals of teeth regarded clinically as ready for filling although this incidence has been materially reduced by present day root canal therapy. Some investigators believe that bacteria do not occur in the dentinal tubules and that it is unnecessary to extract teeth because of dead dentinal tracts. Others are of the opinion that bacteria not only occur in these tubules but that when caries is present they may progress toward the pulp by way of dead tracts of dentin. Secondary dentin on the pulpal side may prevent this progression but such protection may not occur in pulpless teeth. If this is true it must be admitted that prolonged endodontic therapy may produce transient periods of bacteremia but to my knowledge there are no reported cases of subacute bacterial endocarditis traceable to endodontic therapy. Furthermore, cultures of root canals in painful vital teeth made before the extirpation of pulps have been reported as positive in as high as 50 to 55 per cent of cases,[12] while root canal cultures of nonvital teeth by various investigators have been reported as positive in as high as 47 to 89 per cent.[13] In cultures of 426 teeth *in situ* obtained at necropsy, Burket[14] obtained 30.6 per cent positive cultures from teeth with no observable roentgenologic periapical areas, in 76.0 per cent showing small periapical radiolucent changes and in 60.8 per cent of those with large periapical lesions. Contaminations were avoided and since alveolar bone marrow cultures obtained in the same manner were sterile, it appears that positive cultures due to postmortem bacterial invasions could be excluded. In experimentally produced apical lesions of the teeth of monkeys, Genvert and his colleagues[15] observed no systemic effects although he obtained positive periapical cultures of roentgenologically negative teeth with occasional sterile cultures from teeth with well developed radiolucent areas.

In periapical granulomas Rohdenburg and Franken[16] found histologic evidence of infection in 11 per cent and Denston[17] in 58 per cent of cases studied. Positive cultures have been reported by various investigators in 28 to 61.4 per cent of cases.[18] In careful aseptic cultures of root canals of teeth *in situ* by Sommer and Crowley,[19] positive cultures were observed in only 4 to 24 per cent of roentgenologically negative teeth and those presenting roentgenologic evidences of cysts, granulomas and proliferating and circumscribed osteitis. Ostrander and Crowley[20] have reported as high as 52.3 per cent positive cultures in 487 teeth

11. Grossman, L. I. Probable percentage of correct guesses regarding sterility of root canals without bacteriological control. (Abst.) J. D. Res. 15:364 (Sept.) 1936.

12. An evaluation of the effect of dental foci of infection on health. J.A.D.A. 42:609 (June) 1951, p. 643.

13. An evaluation of the effect of dental foci of infection on health. J.A.D.A. 42:609 (June) 1951, p. 642.

14. Burket, L. W. Recent studies relating to periapical infection, including data obtained from human necropsy studies. J.A.D.A. & D. Cosmos 25:260 (Feb.) 1938.

15. Genvert, H.; Miller, H., and Burns, C. G. Experimental production of apical lesions of teeth in monkeys and their relation to systemic disease. Yale J. Biol. & Med. 13:649 (May) 1941.

16. Rohdenburg, G. L., and Franken, S. W. Dental granulomas. J.A.M.A. 93:191 (July 20) 1929.

17. Denston, C. S. Chronic periapical lesions: a detailed study of their pathology, incidence and clinical significance, with special reference to those occurring on deciduous teeth. D. J. Australia 19:540 (Oct.) 1947; 20:1 (Jan.) 1948; 20:81 (March) 1948.

18. An evaluation of the effect of dental foci of infection on health. J.A.D.A. 42:609 (June) 1951, p. 627.

19. Sommer, R. F., and Crowley, M. C. Bacteriologic verification of roentgenographic findings in pulp involved teeth. J.A.D.A. 27:723 (May) 1940.

20. Ostrander, F. D., and Crowley, M. C. The effectiveness of clinical treatment of pulp-involved teeth as determined by bacteriological methods. J. Endodontia 3:6 (Jan.) 1948.

with roentgenologically normal periodontal membranes and 61.3 per cent positive cultures in 119 teeth with roentgenologic evidences of periapical pathology. Undoubtedly periodontal infections, with or without apical and periapical infections, are of most importance in relation to focal infection not only because of the large surfaces exposed to trauma and infection but because of the ease with which microorganisms and their products are absorbed into the lymph and blood. The reported incidence of positive cultures, based on examinations of extracted teeth, must be interpreted with great caution since it is difficult to extract teeth without bacterial contamination which results from "rocking" unless the gingival sulci are first completely sterilized. Otherwise cultures of the periapical tissues can be made through the external alveolar plate by exposure of the root apex or by means of a sterile trocar although, since it is difficult to be sure when the apex is reached by a trocar, negative cultures are of little significance. Furthermore, positive cultures of the pulps of extracted teeth likewise frequently result from contaminations occurring during extractions; for this reason cultures of the pulps of teeth *in situ* are far more reliable and show a materially lower incidence of positive results.

The percentages of positive cultures and the percentages of various microorganisms recovered have varied greatly according to the bacteriologic methods employed. Thus the more recently reported percentages of beta streptococci have varied from about 0.5 to 5.0 per cent, alpha or viridans streptococci from 15 to 45 per cent, gamma or nonhemolytic streptococci from 20 to 40 per cent and staphylococci from 20 to 30 per cent.

Other Foci • Other potentially important primary foci of infection include those of the throat and respiratory tract; as, for example, in tonsillitis and peritonsillar abscess, nasopharyngitis and adenoids, sinusitis (with special reference to ethmoiditis and sphenoiditis), otitis media, mastoiditis, tuberculosis, and chronic bronchitis including bronchiectasis. Genitourinary tract infections include not only gonorrhea and granuloma inguinale, prostatitis and seminal vesiculitis, endocervicitis and salpingitis, but possibly cystitis and pyelonephritis as well. Potential primary foci of the gastrointestinal tract include not only acute and chronic intestinal ulcers, cryptitis and infected hemorrhoids but possibly also cholecystitis, appendicitis and diverticulitis. Other potentially important primary foci embrace the pyodermas (with special reference to furunculosis), lymphadenitis, thrombophlebitis and osteomyelitis.

Multiple Foci • It is readily apparent that some individuals may have multiple primary foci of infection. This fact has an important bearing on both treatment and prognosis. When such multiple foci are discovered, any particular focus assumes less significance in relation to the conditions and diseases potentially resulting from focal infection. For example, infected teeth may be extracted while retained infected roots or bone of former extractions in edentulous areas are overlooked. The presence of multiple primary foci of infection sometimes presents a difficult problem for the physician or the dentist. It is difficult to decide which focus or foci should be eliminated since the basic principle in treatment should be the elimination of all primary foci of infection whenever this is possible.

DIFFICULTIES IN THE DETECTION OF FOCAL INFECTIONS

Unfortunately it frequently is difficult and sometimes impossible for physicians and dentists to detect potential primary foci of infection. Since the detection depends largely on individual diagnostic

skill and the methods employed, the incidence of detection will vary a great deal. As a matter of fact, primary foci of infection need not be inflammatory at all and failure to detect them does not necessarily exclude their presence. Indeed it is commonly stated that dentists do not yet have a satisfactory basis for determining with certainty whether a tooth is infected. Radiolucent areas do not necessarily represent infection such as the periapical granuloma since they may be indicative of cementomas and root cysts. Unfortunately roentgenograms do not always reveal the true nature of radiolucent areas and the presence or absence of infection. This should be determined by root canal cultures on well isolated teeth *in situ* with rigid precautions against contamination.[21] Since, as previously stated, microorganisms may gain entrance to pulps during extractions,[12] cultures of extracted teeth are of little or no clinical value although the cultures of the amputated roots of teeth are acceptable when made with rigid precautions against contamination.

Similar difficulties are encountered by physicians in deciding whether the tonsils are potential foci of infection since no standards have been established for reaching a decision. Consequently, in any group of cases examined by different laryngologists, differences of opinion are to be expected as to whether the tonsils are the sites of chronic infections. During childhood physiologic enlargement of tonsils should not be mistaken for chronic tonsillitis. Furthermore, the expression of so-called "pus" from the crypts does not necessarily indicate infection although this possibility must always be admitted. Certainly bacteriologic examinations are of limited value in reaching a decision although the tonsils should be completely extirpated in individuals subject to repeated attacks of acute tonsillitis or peritonsillar abscesses. Negative roentgenologic examinations do not always exclude the possible presence of nasal sinusitis and skillful clinical examinations frequently are of more diagnostic value. The detection of prostatitis, seminal vesiculitis, endocervicitis and salpingitis as possible primary foci of infection is largely based on clinical skill and experience supplemented by bacteriologic examinations, with rigid precautions against contamination if and when possible.

PATHOGENESIS OF FOCAL INFECTION

The pathogenesis of focal infection refers to the process or processes involved in the production of systemic conditions and diseases secondary to primary sources or foci of infection. Those resulting from direct lymphatic drainage or absorption and direct mucosal continuity or extension require no discussion. The same is true of acute bacterial endocarditis and suppurative arthritis, myositis, meningitis, pneumonitis, nephritis, and so forth, resulting from septicemias secondary to primary foci of infection. These conditions are characterized by pronounced clinical manifestations with positive blood cultures.

Bacteremia • There can be no doubt about the importance of the bacteremias of variable duration which occur without manifest symptoms and which are detectable only by one or more positive blood cultures during periods of bacteremia. To my knowledge no one denies that this is the mechanism concerned in the etiology of subacute bacterial endocarditis secondary to primary sources of infection of dental, tonsillar, intestinal or other origin. This is also true in the etiology of gonococcal arthritis and iritis secondary to gonorrhea; brain abscess secondary to bronchiectasis; generalized miliary tuberculosis, tuberculous osteo-

21. An evaluation of the effect of dental foci of infection on health. J.A.D.A. 42:609 (June) 1951, p. 647.

myelitis, nephritis and, possibly, meningitis secondary to pulmonary tuberculosis. Bacteremia also is apparently responsible for instances of osteomyelitis secondary to primary furunculosis of the skin. Likewise this is true for pyelonephritis, renal carbuncle, perirenal abscess and pericarditis secondary to various primary foci of infection or lung abscess secondary to appendicitis.

The true incidence of transient bacteremias due to primary sources or foci of infection from dental, tonsillar, prostatic and other locations is unknown because of various culture media and amounts of blood cultured by different investigators in addition to the variable percentages of contaminated cultures. Cultures made before the extraction of teeth have been reported as positive in 0 to 10.9 per cent and after extractions and other oral surgical procedures in 8.3 to 72 per cent.[22-31] Transient bacteremias may occur, therefore, not only in suppurative gingivitis but especially after the extractions of infected teeth, and particularly in individuals with moderate or severe gingival or periodontal infections. Positive blood cultures have been reported in 7 to 55 per cent of cases where dental infection is present, following the mastication of mint lumps and paraffin, periodontal scalings and massage of the gums.[32-34] Consequently the incidence of bacteremia is in relation to tissue injury or trauma incident to dental procedures but not necessarily in relation to the number of extractions, since negative blood cultures have been observed after the extraction of five or more teeth at one sitting while positive cultures have occurred after the extraction of only one or two teeth.

Bacteremias are made possible by invasion of microorganisms through gingival crevices by the pumping or piston-like action of forceps and elevators, and the suction action of the venous blood until coagulation has occurred or the post-extraction inflammatory reaction seals the veins. Local anesthesia with procaine and epinephrine tends to reduce their incidence. Needless to state, the extraction of frankly abscessed teeth is more likely to result in bacteremia than the extraction of roentgenologically negative teeth although positive blood cultures have been observed following extractions of the latter. To my knowledge there are no reported instances of bacteremia following root canal therapy and opinions vary as to whether it may occur; at least, there are no reported cases of subacute bacterial endocarditis traceable to this procedure.

Much less investigation has been devoted to the detection of transient bacteremias following the extirpation or manipulation of other primary foci of infection. Elliott,[35] in a series of 82 cases, observed positive blood cultures in 7 or

22. Okell, C. C., and Elliott, S. D. Bacteraemia and oral sepsis, with special reference to etiology of subacute endocarditis. Lancet 2:869 (Oct. 19) 1935.

23. Fish, E. W., and MacLean, I. The distribution of oral streptococci in the tissues. Brit. D.J. 61:336 (Sept. 15) 1936.

24. Burket L. W., and Burns, C. G. Bacteremias following dental extraction. Demonstration of source of bacteria by means of a non-pathogen (serratia marcescans). J. D. Res. 16:521 (Dec.) 1937.

25. Hopkins, J. A. Streptococcus viridans: bacteremia following extraction of teeth. J.A.D.A. 26:2002 (Dec.) 1939.

26. Paquin, O., Jr. Bacteremia following the removal of diseased teeth. J.A.D.A. 28:879 (June) 1941.

27. Faillo, P. S. Blood findings on twenty patients before and after extraction of teeth. J. D. Res. 21:19 (Feb.) 1942.

28. Bender, I. B., and Pressman, R. S. Factors in dental bacteremia. J.A.D.A. 32:836 (July) 1945.

29. Rhoads, P. S., and Schram, W. R. Bacteremia following tooth extraction; prevention with penicillin and gantrosen. J. Lab. & Clin. Med. 33:1461 (Nov.) 1948.

30. Glaser, R. J., and others. Effect of penicillin on the bacteremia following dental extraction. Am. J. Med. 4:55 (Jan.) 1948.

31. Hirsh, H. L., and others. Effect of prophylactically administered penicillin on incidence of bacteremia following extraction of teeth: results in patients with healed rheumatic and bacterial endocarditis. Arch. Int. Med. 81:868 (June) 1948.

32. Lazansky, J. P.; Robinson, L., and Rodofsky, L. Factors influencing the incidence of bacteremias following surgical procedures in the oral cavity. J. D. Res. 28:533 (Dec.) 1949.

33. Round, H.; Kirkpatrick, H. J. R., and Hails, C. G. Further investigations on bacteriological infections of the mouth. Proc. Roy. Soc. Med. 29:1552 (Oct.) 1936.

34. Murray M., and Moosnick, F. Incidence of bacteriemia in patients with dental disease. J. Lab. & Clin. Med. 26:801 (Feb.) 1941.

35. Elliott, S. D. Bacteriaemia following tonsillectomy. Lancet 2:589 (Sept. 9) 1939.

8.5 per cent immediately before tonsillectomy and in 38 or 26.3 per cent within five minutes after operation. Barrington and Wright[36] have reported also the occurrence of transient bacteremias following manipulations of the lower urinary tract. In a series of 32 cases of chronic tonsillitis, the writer found negative blood cultures in all immediately before operation but positive cultures in 4 or 12.5 per cent within 10 minutes after operation. In all of a series of 18 cases of chronic prostatitis negative blood cultures were observed immediately before prostatic massage but positive cultures in 2 or 11.1 per cent within 5 to 10 minutes after this procedure. Ten to 20 milliliters of blood was cultured in each instance. These observations were made about 20 years ago.

The transient nature of these bacteremias is indicated by the fact that positive blood cultures usually occur within 10 minutes following manipulations of these primary foci of infection. Thereafter the incidence is reduced with positive cultures in only occasional cases one-half to four or six hours later. In other words, the invading microorganisms are apparently rapidly removed from the blood by phagocytosis by the cells of the reticuloendothelial system and other immunological processes. Insofar as dental infections are concerned bacteremia is usually due to alpha (viridans) and gamma streptococci followed in order of frequency by staphylococci, beta streptococococci and pneumococci. The same organisms, in addition to *H. influenzae,* have been observed in instances of bacteremia following tonsillectomy, while bacteremias after manipulations of infected prostate glands and the lower urinary tract may be due not only to streptococci and staphylococci but to coliform bacilli as well. Insofar as primary infections with beta streptococci are concerned, the production of streptokinase (fibrinolysin) and streptococcal proteinase are important spreading agents tending to bacteremia. The same is true of the mucolytic enzyme hyaluronidase produced by streptococci, staphylococci, pneumococci and other microorganisms. Hyaluronidase not only promotes tissue permeability and invasiveness through the hydrolysis of hyaluronic acid in the collagen of connective tissue, but may increase capillary permeability as well. Needless to state, diphtheroid bacilli and other nonpathogenic organisms also have been found in blood cultures. It is likely that these were due to contamination. The incidence of contaminations in routine blood cultures may vary as much as 8 to 10 per cent.

Whether transient bacteremias occur in chronic paranasal accessory sinusitis cannot be stated but it appears reasonable to assume that such is the case, especially during acute exacerbations of the disease and after instrumental manipulations. For example, it is well known that meningococci, streptococci, pneumococci, *H. influenzae* and other organisms frequently invade the lymph and blood during relatively minor infections of the upper respiratory tract and, as previously stated, apparently under relatively normal conditions as well. Furthermore it is also both possible and probable that invasion may occur by way of the normal or infected gastrointestinal mucosa.

Elective Localization • If any of the diseases of focal infection are due to secondary foci of infection resulting from bacteremias, the question of what determines these secondary localizations is of great interest. A number of pathogenic bacteria display an affinity or elective localization for particular organs or tissues, such as the predominant tendency of meningococci to infect the meninges, gonococci the urethra and adnexa and pneumococci the respiratory tract. It is

36. Barrington, F. J. F., and Wright, H. D. Bacteriaemia following operations on the urethra. J. Path. & Bact. 33:871 (Oct.) 1930.

not necessary for physicians and dentists to assume that streptococci, staphylococci or other microorganisms in primary foci of infection acquire a specific or selective affinity for this or that organ or tissue as postulated by Rosenow.[37] Indeed, this theory of elective localization has been largely if not entirely abandoned. Abandoning the theory, however, does not detract from the important principles of focal infection in the etiology of systemic diseases.[5, 38] Rather it appears that there are other factors which determine the secondary localization of infection. These factors are the altering of the endothelium of capillaries with reduction in circulation and anoxia of the tissues, capillary occlusion due to scarring as in chronic valvular and congenital heart disease resulting in subacute bacterial endocarditis, reduced circulation due to trauma, inflammation, or fatigue. Another factor is the possibility of vascular changes due to heredity tending to capillary occlusion, especially in the etiology of rheumatoid arthritis. Under the circumstances it is easy to understand why some individuals with minor primary foci of infection, or no detectable foci at all, develop diseases potentially due to focal infection while others with pronounced primary foci escape these diseases at least temporarily.

Bacterial Toxins • It is reasonable to assume that such general conditions as anemia, anorexia, or fatigability, may be due to the production and absorption of exogenous or endogenous bacterial toxins or other toxic products in primary foci of infection. In this sense diphtheria may be regarded as a focal infection with myocarditis, paralysis of the palate due to peripheral neuritis and paralysis of the third and other cranial nerves as secondary manifestations of the disease. Tetanus likewise falls into this category. Some investigators have also postulated that the lesions of rheumatic carditis and glomerulonephritis may be due to the exogenous toxins of beta streptococci produced in various primary foci of infection with special reference to the upper respiratory tract. In this connection Weld[39] has reported that hemotoxin and leukocidin extracted from beta streptococci, with inactivated serum, were highly toxic for mice with the production of considerable degeneration of the tubular epithelium of the kidneys. Whether bacterial toxins play a role in the etiology of the diseases of focal infection cannot be stated, however, although the possibility is to be admitted at least in those cases showing prompt and sometimes dramatic recovery following the extirpation or drainage of primary foci of infection. On the other hand, if the absorption of these toxic products is prevented by chronic inflammatory changes or encapsulation of the primary foci or, if upon absorption they are effectively neutralized by natural or acquired antibodies, ill health will not result.

Hypersensitivity and Other Possible Mechanisms • It is also possible and highly probable, as originally stated by Billings, that acquired hypersensitivity to bacteria or their soluble products in the primary foci of infection plays a role in the genesis of the secondary lesions of focal infection. If this is true one must assume that the bacteria or their products reach secondary foci by way of the blood, with local allergic sensitization of the tissues along with or without sensitization of the skin. As far back as 1928, Zinsser[40] suggested the role of acquired allergic sensitization to bacteria or their toxins emanating from foci of infection.

37. Rosenow, E. C. Focal infection and elective localization. Internat. Clin. 2:29 (June) 1930.

38. Holman, W. L. The localization in animals of bacteria isolated from foci of infection. J.A.M.A. 88:424 (Feb. 5) 1927.

39. Weld, J. T. The toxic properties of serum extracts of hemolytic streptococci. J. Exper. Med. 59:83 (Jan.) 1934; 61:473 (April) 1935.

40. Zinsser, H. Significance of bacterial allergy in infectious diseases. Bull. New York Acad. Med. 4:351 (March) 1928.

Swift[41] has also stated that hypersensitivity to the products of beta streptococci was apparently concerned in the etiology of rheumatic fever. Later Angevine, Cecil and Rothbard[42] reported that products of beta streptococci injected intravenously or intracutaneously in rabbits reached and presumably sensitized the synovial membranes of rabbits resulting in the production of chronic inflammatory changes. A year later further support for the assumption that allergic sensitization played a role in the genesis of rheumatic carditis was furnished by Rich and Gregory,[43] who apparently produced the lesions of this disease experimentally in rabbits by active sensitization with horse serum. Rich[44] later suggested that the lesions of rheumatic carditis and probably those of glomerulonephritis as well, may be due to the effects of vascular and collagen injuries through hypersensitivity to a variety of different antigens. Freyburg[45] has also expressed the opinion that the relation of focal infection to rheumatic fever and rheumatoid arthritis is through acquired allergic sensitization to streptococci or their products. As stated by Goldberg,[46] the early changes of hyperemia and minute hemorrhages with perivascular lymphocytic and plasma cell infiltrations of the synovial membranes in rheumatoid arthritis suggest this mechanism. In this connection it can also be stated that the pharmacologic and therapeutic effects of corticotropin (ACTH) and cortisone in rheumatoid arthritis suggest the allergic nature of this disease, since these hormones are known to be antiallergic and effective in the treatment of bronchial asthma, hay fever, angioneurotic edema, serum sickness and drug allergies.

Furthermore, Smadel[47] and other investigators have shown that glomerulonephritis can be induced in rats by the injection of anti-kidney sera obtained from rabbits immunized with suspensions of rat kidney. Such sera contain not only antibodies capable, on injection into rats, of inducing a severe anaphylactoid reaction with general vascular manifestations that involve the kidneys and other organs, but also a nephrotoxin that affects the kidneys primarily. Schwentker[48] has also shown that when mixtures of streptococcus or staphylococcus toxins and emulsions of rabbit kidney are repeatedly injected into rabbits an acute glomerulonephritis is produced which may be due to an anaphylactoid reaction. Insofar as rheumatic fever is concerned, Schultz and Rose[49] have observed that mixtures of group A beta streptococci and the albumin constituents of embryonal connective tissue or blood serum produce extremely labile conjugates which, on administration to mice, produce lesions similar to those observed in rheumatic carditis. Normal human beings were found to be reactive to intramuscular injections of these conjugates but rheumatic individuals were found to be exceedingly hypersensitive to them. Furthermore, gradually increasing doses resulted in increasing tolerance in both normal and rheumatic individuals which suggests a process of desensitization.

41. Swift, H. F. Rheumatic fever. J.A.M.A. 92:2071 (June 22) 1929.

42. Angevine, D. M.; Cecil, R. L., and Rothbard, S. Influence of various types of immunization on the genesis of experimental hemoly"c streptococcus arthritis. Arch. Path. 34:18 (July) 1942.

43. Rich, A. R., and Gregory, J. E. Experimental evidence that lesions with the basic characteristics of rheumatic carditis can result from anaphylactic sensitivity. Bull. Johns Hopkins Hosp. 73:239 (Oct.) 1943; 75:115 (Aug.) 1944.

44. Rich, A. R. The role of hypersensitivity in the pathogenesis of rheumatic fever and periarteritis nodosa. Proc. Inst. Med. Chicago 15:270 (March 15) 1945.

45. Freyberg, R. H. "Focal infection" in relation to rheumatic diseases: a critical appraisal. J.A.D.A. 33:1101 (Sept.) 1946.

46. Goldberg, S. The pathology of arthritis. Am. J. Clin. Path. 14:1 (Jan.) 1944.

47. Smadel, J. E. Experimental nephritis in rats induced by injection of anti-kidney serum. J. Exper. Med. 64:921 (Dec.) 1936.

48. Schwentker, F. F., and Comploier, F. C. Production of kidney antibodies by injection of homologous kidney plus bacterial toxins. J. Exper. Med. 70:223 (Sept.) 1939.

49. Schultz, M. P., and Rose, E. J. "Albumin-bacterioplasma conjugates" with special reference to the etiology of rheumatic fever. Pub. Health Rep. 62:1009 (July 11) 1947.

On the other hand, these effects may be due to the production of auto-antibodies or other substances since Cavelti and Cavelti[50, 51] have found in their studies on the pathogenesis of glomerulonephritis and rheumatic fever that the sera of rats and rabbits repeatedly injected with mixtures of emulsified homologous kidney or heart and group A beta streptococci produce collodion particle agglutination of the antigens. These experiments suggest, therefore, that streptococci by producing injury of the connective tissues of the body, or in conjunction with them, may engender the production of substances which in turn produce lesions which may be progressive or reactivated by repeated exposures to these microorganisms.

RESISTANCE AND IMMUNITY TO FOCAL INFECTION

Under the circumstances it may be stated that at least one mechanism in the production of the secondary diseases of focal infection is the occurrence of transient periods of bacteremia. Except in subacute bacterial endocarditis and tuberculosis, however, absolute proof on the basis of finding microorganisms in the secondary lesions frequently has been lacking. The difficulties encountered in securing tissues in the early stages of rheumatoid arthritis and other diseases for cultures and histologic examination is responsible for the lack. It is likely that the secondary lesions of focal infection may be due to the inflammatory changes produced by various bacterial toxins, acquired hypersensitivity to bacteria or their products, acquired hypersensitivity to the products of interaction between bacteria or their products and various tissues, or to the direct inflammatory changes produced by these products without involving the matter of acquired allergic sensitization to them.

Needless to state only a relatively small percentage of individuals with various primary foci of infection develop the detectable secondary conditions and diseases of focal infection. A much larger percentage escape manifestations of ill health, at least temporarily, because of natural resistance or acquired immunity. As stated by Kern,[52] every farmer knows that lighting matches in barns is a real hazard although the number escaping damage or destruction exceeds the number burning down, so likewise primary foci of infection may produce ill health only in some individuals.

Undoubtedly the degree of vascularity of primary foci of infection is important in the dissemination of bacteria and their products. Paradoxically, however, foci presenting the minimum of inflammatory changes are potentially the more dangerous. Inflammation produces a nonspecific resistance by arresting the spread of bacteria through the production of mechanical barriers of coagulated plasma, blockade of lymphatics and veins, fixation of foreign materials and the mobilization of leukocytes and other cells even though these factors may not completely prevent the absorption and dissemination of soluble toxic products. This local resistance may be due not only to such nonspecific factors but even more to phagocytosis, the production of specific antibodies and possibly to acquired allergic sensitization as well. All of these constitute local immunity. At least it has long been established that acquired immunity in syphilis begins in the chancre. Just as clinical experience has shown the importance of early diagnosis and treatment of this lesion, so likewise early diagnosis and treatment of other primary foci of infection in the interests of the present and future health of individuals is im-

50. Cavelti, P. A., and Cavelti, E. S. Studies on the pathogenesis of glomerulonephritis. Arch. Path. 39:148 (March) 1945; 40:158 (Sept.); 40:163 (Sept.) 1945.

51. Cavelti, P. A. Studies on the pathogenesis of rheumatic fever. Arch. Path. 44:1 (July); 44:13 (July) 1947.

52. Kern, R. A. What is left of the theory of focal infection? M. Clin. North America 34:1705 (Nov.) 1950.

portant. These factors of natural resistance or immunity offer additional explanations of why the existence of primary foci of infection does not *per se* carry the danger of incurring the conditions and diseases of focal infection although this danger is always potentially present.

Furthermore, various general factors such as individual differences in heredity and various physiologic, metabolic, biochemical and hormonal activities have an important bearing on nonspecific natural resistance to focal infections.[53] These, along with natural or acquired immunity, may afford additional explanations as to why the incidence of detectable primary foci of infection may be almost as high in presumably healthy individuals as in those with secondary conditions and diseases.

Although the influence of heredity is difficult to appraise, it appears to have some influence especially when there is an inherent inferiority of the tissues and organs. This is apparent in those instances of rheumatoid arthritis occurring in daughter, mother and grandmother. Heredity and constitution have been found to exert a decided influence on increasing or reducing acquired resistance to experimental infections in the lower animals.[54, 55] Furthermore, there can be no doubt about the importance of heredity in predisposing to both natural and acquired allergy and this may have a direct bearing on those diseases of focal infection regarded as being due probably to acquired allergic sensitization of tissues to bacteria or their products in primary foci of infection. Undoubtedly some differences in natural and acquired resistance to focal infections also exist between the two sexes, but it is always difficult to untangle the influence of sex from that of heredity. While it appears that the gonadal hormones are of some importance in this connection, especially in relation to puberty, menstruation and the menopause, there is little or no evidence to support the hypothesis that susceptibility or resistance are carried by sex-linked chromosomes. It is generally admitted that fatigue can be a factor in reducing resistance to infection, including focal infection. This reduction in resistance may be due not only to deficiency in opsonins and phagocytosis but to a deficiency in the secretion of cortisone as well. The influence of fatigue, however, is more apparent in the activation of latent infections than in predisposition to primary infections. That cold and lack of physical fitness are important factors in reducing natural resistance to infections is amply confirmed, not only by clinical experience but by the investigations of Locke[56] with the lower animals. These factors apparently affect the capacity for sustaining adequate capillary circulation which has been found essential for the efficient functioning of the mechanisms maintaining vascular tone and body temperature. Malnutrition also may be a factor in reducing resistance to infection, including focal infection, and may be due partly to severe deficiencies in various vitamins. Cannon[57] has shown, however, that reduced resistance is more likely to be due to a depletion of plasma and tissue proteins, including essential amino acids, which are so necessary for the synthesis of antibody gamma globulin by the reticuloendothelial and other body cells—a synthesis in which vitamins, enzymes and salts may play an active role.

The effect of hormones on the reduction of resistance and immunity to infections is shown not only by the influence of deficiencies in the gonadal hormones

53. Perla, D., and Marmorston, J. Natural resistance and clinical medicine. Baltimore, William Wood & Co., 1941.

54. Webster, L. T. Inherited and acquired factors in resistance to infection. J. Exper. Med. 57:793; 57:819 (May) 1933.

55. Lurie, M. B., and others. Constitutional factors in resistance to infection. Am. Rev. Tuber. 59:168, 1949.

56. Locke, A. Non-specific factors in resistance. I. Capacity to sustain effective circulation. J. Immunol. 36:159 (Feb.) 1939.

57. Cannon, P. R. Antibodies and the protein-reserves. J. Immunol. 44:107 (June) 1942.

previously mentioned, but also by the deficiency in insulin which results in diabetes mellitus with increased susceptibility to pyogenic and other infections. Likewise the effect is shown not only by the possibility of deficient secretions of corticotropin (ACTH) and cortisone increasing susceptibility to allergic sensitization of the tissues, but by the fact that the giving of these hormones fails to protect the lower animals against lethal infections. Also there is the possibility that their administration to human beings may not only suppress antibody production causing increased susceptibility to infections but also conceal the latter through the suppression of fever as well. In this connection it should be stated that the "alarm reaction" of Selye,[58] which is caused by any type of stress including that caused by emotional disturbances, trauma, hemorrhage or exposure to cold, is also mediated through stimulation of the anterior lobe of the pituitary gland with the excessive secretion of corticotropin (ACTH) which in turn results in the excessive secretion of cortisone.

In addition to these nonspecific factors in the mechanism of resistance to primary infections and secondary focal infections, there can be no doubt about the importance of specific natural antibodies and phagocytosis as well. Not only the natural antitoxins but also especially the natural opsonins and bacteriolysins are important in the prevention and control of bacteremia. Undoubtedly, phagocytosis, especially by the sessile and wandering histiocytes or macrophages of the reticuloendothelial system, along with plasma cells, lymphocytes and neutrophilic leukocytes of the blood, constitute the basic and most important clearing mechanism. This clearing mechanism, however, is subject to interference and reduction in individuals exposed to cold or in poor general condition. The production of bacterial haptens and leukocidins also interferes or reduces such clearance. Acquired specific antibodies and phagocytosis play important roles in the mechanism of recovery from focal infections. Antibody tests, like those of agglutination, precipitation and complement fixation are of limited value in the diagnosis of focal infections. The same is true of skin tests with bacterial antigens to determine acquired allergic sensitization to various microorganisms or their products, although of value in some instances. Insofar as infections with group A beta streptococci are concerned, tests for antifibrinolysin, antistreptolysin and antihyaluronidase are of diagnostic value.

SYSTEMIC CONDITIONS AND DISEASES DUE TO FOCAL INFECTION

Potentially any acute or chronic, localized or diffuse, primary focus or source of infection may produce ill health. Fortunately, however, ill health due to focal infection is prevented in most instances by local resistance to the hematogenous or lymphogenous dissemination of microorganisms and their soluble products. This resistance is supplemented by specific natural or acquired immunity, as for example by phagocytosis. Naturally there should be prompt and adequate treatment of primary foci of infection. As previously discussed, however, certain nonspecific factors reduce natural resistance and thereby predispose some individuals to the diseases of focal infection. Consequently, whether ill health due to focal infection occurs involves the pathogenicity of the infecting microorganism on the one hand and the resistance or immunity of the individual on the other, with the balance between them deciding the outcome. This explains why some individuals with obvious focal infections escape ill health while others are not so fortunate.

58. Selye, H. General adaptation syndrome and diseases of adaptation. J. Clin. Endocrinol. 6:117 (Feb.) 1946.

Among the systemic conditions occurring from focal infection and presumably resulting from the absorption of toxic bacterial products may be listed general debility and fatigability, anorexia, loss of weight, excessive drowsiness, headache, hypochromic anemia, acquired hypotension and general reduction of immunologic resistance to intercurrent infections.

The diseases resulting from focal infection are many and diverse. In some of these diseases the role of focal infection in their etiology has been proved while in others present information justifies the assumption that focal infection may be a factor of variable importance in etiology. In this connection it is helpful to classify the diseases on the basis of the proved or probable mechanism involved although in some instances this can be only tentative at the present time.

Thus some diseases are due to the septicemias, secondary to primary foci of infection, such as acute bacterial endocarditis and suppurative arthritis, myositis, pneumonitis, or nephritis.

Many are due to the bacteremias or toxemias as, for example, subacute bacterial endocarditis; some cases of acute pericarditis; gonococcal arthritis, iritis and tenosynovitis; acute polyarthritis secondary to acute primary foci of infection; typhoidal, brucellar and other nonsuppurative types of specific infectious arthritis; acute generalized miliary tuberculosis, osteomyelitis, arthritis, uveitis, nephritis and meningitis secondary to primary foci of tuberculous infection; brain abscess secondary to bronchiectasis; osteomyelitis secondary to furunculosis; pyelonephritis, renal carbuncle, perirenal abscess, episcleritis, iritis, iridocyclitis, choroiditis, cholecystitis, and some cases of suppurative and nonsuppurative thyroiditis resulting from primary foci of infection of dental, tonsillar, prostatic, or other origin.

Some are due to lymphogenous infections secondary to primary sources of infection as for example in lymphadenitis and some cases of pyelitis and pyelonephritis. Others are apparently due to secondary infections by direct continuity like tracheitis, bronchitis, and some cases of acquired bronchiectasis secondary to nasal sinusitis and thrombophlebitis secondary to various primary foci of infection. Finally, some are apparently due to acquired allergic sensitization to infecting microorganisms or their soluble products as, for example, acute and chronic glomerulonephritis, rheumatic fever, and intrinsic asthma secondary to nasal sinusitis.

In other diseases, focal infection may be regarded as only a possible or precipitating factor in etiology. These diseases include, apparently, rheumatoid arthritis with nodular perineuritis and nodular polymyositis; also fibrositis (intramuscular, periarticular, tendinous, bursal, fascial, perineural and panniculitic) which produces lumbago, torticollis, bursitis, tendon attachment syndrome, or neuritis. In certain diseases of the skin, for example, some cases of acne, pyoderma gangraenosum, chronic and recurrent pyodermas, eczema, urticaria, erythema multiforme and nodosum, primary foci of infection of dental, tonsillar or other origin may play a role in etiology only on the basis of clinical observations. The eradication of the focal infection is frequently of therapeutic value. In this connection it should be noted that primary foci of infection may aggravate or complicate other systemic diseases or conditions. This sometimes is observed clinically in hyperthyroidism, diabetes mellitus, tuberculosis, acne vulgaris, syphilis during arsenical or bismuth therapy, or in pregnancy.

Of all the diseases mentioned none have been responsible for as much discussion or difference of opinion as rheumatoid arthritis. That it is a systemic disease and not a disease of the joints alone is indicated by the presence of unusual cardiac lesions which occur in some individuals. The question at issue is

whether rheumatoid arthritis is a disease due at least in part to focal infection. In 1938 Hench,[59] in a thorough review of the disease, stated that as a clinician he was committed to its bacterial etiology since the evidence was impressive although not conclusive. Freyburg[45] has expressed a similar opinion. Lansbury[60] has also recently subscribed to this point of view on the basis of the disease being due probably to acquired allergic sensitization of synovial membranes and periarticular tissues to microorganisms or their products, which is frequently preceded or precipitated by primary foci of infection. Cecil, Angevine and Rothbard,[61] have succeeded in producing chronic arthritis in rabbits with synovial lesions similar to those commonly observed in rheumatoid arthritis, not only by the intravenous injection of small doses of beta and alpha (viridans) streptococci but likewise in 12.2 per cent of the animals by infection of the gums, maxillary sinuses, gallbladder and other organs. Cultures of the blood and synovial fluids are usually sterile[62] with or without an increase of streptococcal agglutinins and precipitins, antistreptolysin and antifibrinolysin in the sera with increased titers possessing but doubtful significance.[63] Consequently the disease has been included herewith among those in which focal infection is regarded as but one possible factor in an acquired allergic sensitization to streptococci or their products. If this is true it may explain not only why sulfonamide and antibiotic compounds have failed in treatment but also why corticotropin (ACTH) and cortisone, because of their antiallergic effects, have proved therapeutically effective.

TREATMENT OF CONDITIONS AND DISEASES DUE TO FOCAL INFECTION

Eradication of Primary Foci of Infection • Undoubtedly a basic principle in the treatment of the diseases of focal infection is the prompt eradication of the primary focus or foci of infection whenever possible. In some instances, especially in acute primary infections, this can be accomplished with chemotherapeutic agents such as antibiotic or sulfonamide compounds, used alone or in combination, together with adjuvant measures. In chronic primary infections such procedures may fail in the complete eradication of the infection; for example, in nasal sinusitis, tonsillitis, prostatitis or endocervicitis. In these instances the surgical drainage or extirpation of primary foci of infection may be required. Such instances demand the finest clinical judgment in order to avoid needless extraction of teeth or removal of tonsils. In long established diseases, surgical measures may fail therapeutically and both physicians and dentists should carefully explain this possibility to their patients. These measures are not likely to be of benefit in rheumatoid arthritis of one or more years' duration.

When infections of the teeth are present, a final decision on the matter of extractions should be made by competent dentists. In view of modern root canal therapy, pulpless or nonvital teeth may not necessarily require extraction, since, if the surface is rendered sterile and the canal is well filled, repair of destroyed periapical bone is always likely to occur. Apicoectomy or periapical curettage is successful in selected cases. Some dentists are of the opinion that it is not necessary to extract pulpless teeth if two or three consecutive sterile root canal cultures are

59. Hench, P. S. Is rheumatoid (atrophic) arthritis a disease of microbic origin? A summary of the arguments for and against the infectious theory, in a survey of chronic rheumatic disease. London, Oxford University Press, 1938.

60. Lansbury, J. Infection and rheumatoid arthritis. M. Clin. North America 34:1693 (Nov.) 1950.

61. Cecil, R. L.; Angevine, D. M., and Rothbard, S. Experimental arthritis in rabbits produced with streptococci and other organisms. Am. J. M. Sci. 198:463 (Oct.) 1939.

62. Fraser, T. N. Blood cultures in rheumatoid arthritis (historical and personal observations). Ann. Rheumat. Dis. 3:181 (May) 1943.

63. Wallis, A. D. (Rheumatoid arthritis. Am. J. M. Sci. 212:713 (Dec.) 1946; 213:87 (Jan.) 1947.

obtained before permanent fillings are inserted and reexaminations are made every six months over a period of one or two years and then at yearly intervals. Other dentists, however, doubt the value of negative root canal cultures because of the possible presence of pathogenic microorganisms in the dentinal tubules, which eventually makes extraction necessary. Certainly physicians, as well as dentists should not only guard patients with osteoarthritis, traumatic arthritis, gouty arthritis and psychogenic arthritis against the needless extraction of teeth but, when diseases due to focal infections are present, inform cooperating dentists to eradicate all possible dental foci of infection as thoroughly as possible by whatever methods they consider necessary or advisable. In other words, the major responsibility is passed on to dentists where it properly belongs.

Not infrequently the extirpation or drainage of primary foci of infection is of therapeutic value, affording relief from the conditions and diseases due to focal infection with subsequent improvement in general health. Relief after extractions, tonsillectomy or other operative procedures may be due in part to coincidence, chance or psychologic influence. There is also the possibility of the operation producing an "alarm reaction" with consequent increased secretion of corticotropin (ACTH) and cortisone affording temporary relief. This occurs in rheumatoid arthritis and other diseases of focal infection due to acquired allergic sensitization to microorganisms or their soluble products. But, as previously stated, one reason why some physicians and dentists are skeptical about the part focal infection plays in the etiology of disease is the frequency with which these measures are without therapeutic value. In my experience, they have been highly beneficial at times, especially when employed early in the disease. Furthermore, the extirpation or drainage of primary foci of infection may prevent or retard further progression of the secondary diseases. Sometimes such surgical measures result in a temporary exacerbation of the condition or disease which may be interpreted as showing an etiologic relationship between the primary focus and the secondary manifestations. In a grave disease such as subacute bacterial endocarditis, primary foci should never be disturbed until the patient is fully protected by adequate antibiotic therapy and, in the case of infected teeth, only one or two should be extracted at a time.

Various reasons may be offered in explanation of the therapeutic failure of extirpation or drainage of primary foci of infection. In the first place, there may be multiple foci, with one or more undiscovered and thereby overlooked or so located as to be inaccessible to surgical measures or disinfection. In the second place, the secondary diseases may be so well established as to be independent of the primary focus or foci of infection. In the third place, the chronic inflammatory or other changes resulting from direct infection or acquired bacterial allergic sensitization may be irreversible and thereby beyond repair or recovery.

Chemotherapy • Antibiotic therapy is frequently of value after the eradication of primary foci of infection, especially in those diseases of focal infection due to the septicemias and bacteremias. As far as possible compounds should be selected on the basis of accurate bacteriologic examinations and sensitivity tests. Spaulding and Anderson[64] have found the disk method of testing simple, inexpensive and satisfactory. Since the strains within a single bacterial species may vary widely and in an unpredictable manner because of natural or acquired resistance,[65] such

64. Spaulding, E. H., and Anderson, T. G. Selection of antimicrobial agents by laboratory means. J.A.M.A. 147:1336 (Dec. 1) 1951.

65. Kolmer, J. A. Acquired resistance of bacteria to antibiotic compounds. J.A.D.A. 38:60 (Jan.) 1949.

tests are valuable and often indispensable guides to successful treatment of refractory and relapsing infections. Antibiotic and sulfonamide compounds have proved ineffective in the treatment of rheumatoid arthritis probably because it is a disease associated with allergy. Gold salts, despite their toxic effects and the tendency for relapses after successful treatment, are regarded by Lansbury[66] as the most effective compounds in the treatment of this disease.

Vaccine Therapy • Vaccine therapy, originally advocated by Billings and widely employed in former years, has now been largely abandoned. This is not to be wondered at in view of all the abuses committed in its name, especially in the methods of preparation and administration. My own experience during the past 40 years has been exclusively with autogenous vaccines. These vaccines have proved sufficiently satisfactory to include them in therapeutic programs, particularly in the treatment of chronic recurrent iritis and other ocular diseases, intrinsic asthma, fibrositis (especially in myositis, perineuritis or bursitis), and in rheumatoid arthritis. Great care is required in securing cultures of primary foci of infection and there must be rigid precautions taken against contamination. In the great majority of instances the vaccines have been prepared of viridans streptococci alone or in combination with coagulase positive staphylococci. During the past 20 or more years these vaccines have been prepared by cultivating pure cultures in suitable broth media for at least five days in order to incorporate any exogenous or endogenous toxins produced, and the unfiltered cultures have been standardized by turbidity and sterilized with tricresol or phenol, in order to secure the maximum of antigenic activity.[66] In rheumatoid arthritis the initial doses of the vaccine, by subcutaneous injection, frequently contain as low as approximately 10,000 of the chemically killed organisms. This is done in order to produce only mild focal reactions or, preferably, none at all. Thereafter the dosage is adapted to the individual case as a standard dosage applicable to all patients has been found impossible. If focal reactions are mild or do not occur, each succeeding dose, given at weekly intervals, is very gradually increased. If and when marked focal reactions occur, succeeding doses are not given until the reactions have subsided. This vaccine therapy, which is not instituted at all unless it is possible to give it over a period of four to six months or longer, is for the purpose of raising immunologic resistance by producing the specific type of anamnestic reaction or by bringing about gradual and progressive allergic bacterial desensitization. Something worth while may be accomplished if the damage already done is not completely irreversible. Needless to state variable therapeutic results have been observed. Such variations were due in part to genetic differences in the capacity of individuals to respond to treatment.

Nonspecific Protein Therapy • Nonspecific protein or shock therapy,[67] so popular about 30 years ago in the treatment of rheumatoid arthritis, iritis and other ocular diseases and various other acute and chronic infections, by intravenous injections of stock typhoid-paratyphoid vaccine or intramuscular injections of sterilized milk or milk products, likewise has fallen largely into disuse, especially since the advent of sulfonamide and antibiotic therapy. There can be no doubt, however, about its therapeutic efficacy in chronic ocular and other infections and in early cases of rheumatoid arthritis although it is not without danger and there must be a careful selection of pa-

66. Kolmer, J. A. Principles of vaccine therapy. Am. J. Clin. Path. 1:355 (Sept.) 1931.

67. Petersen, W. F. Protein therapy and nonspecific resistance. New York, Macmillan Co., 1922.

tients. The mechanism of its activity has never been completely explained although, since reactions of fever, chills and leukocytosis were generally required for maximum therapeutic effects, it is now thought that this type of treatment may owe its efficacy not only to fever and nonspecific anamnestic reactions with increased antibody production, but to the production of "alarm reactions" resulting in the increased secretion of corticotropin (ACTH) and cortisone as well.

Corticotropin (ACTH) and Cortisone Therapy • Except for therapeutic effectiveness in the treatment of rheumatic fever, rheumatoid arthritis, intrinsic asthma and inflammatory diseases of the eyes, it is difficult to define the status at the present time of corticotropin (ACTH) and cortisone in the treatment of the diseases of focal infection. Cortisone is probably identical with those group specific chemical substances, produced in hepatitis with severe jaundice and pregnancy which are responsible for remissions of rheumatoid and psoriatic arthritis, allergic diseases, Addison's disease, or myasthenia gravis. However, there is no evidence of increased adrenal activity in jaundice.[68,69] Indeed, the mechanism of the therapeutic activity of cortisone is still unknown except that while without bacteriostatic, bactericidal and antitoxic properties or antihistaminic activity, it produces antiallergic effects. Consequently, corticotropin (ACTH) and cortisone may be effective in the treatment of those diseases of focal infection due to acquired allergic sensitization to bacteria or their products in primary foci of infection. Also they may be effective in the prevention of bacteremia because of their inhibiting effects on the "spreading" activity of hyaluronidase. Rich and his colleagues[70,71] have observed that the administration of corticotropin (ACTH) and cortisone inhibits the development of the cardiovascular and proliferative glomerular lesions which are normally produced in rabbits by anaphylactic hypersensitivity to horse serum.

Cortisone also accumulates in foci of infection and modifies inflammatory reactions by reducing capillary permeability. It has no effect on preformed antibodies. Large doses may reduce phagocytosis of bacteria, interfere with the synthesis of antibodies and depress immunologic resistance, resulting in increased susceptibility to experimental infections.[72] Consequently, cortisone should be avoided in acute and chronic infections because of the risk of activating latent foci of infection with consequent danger of secondary bacterial infections such as pneumonia and rapidly progressive pulmonary tuberculosis.[73] Indeed, corticotropin (ACTH) and cortisone probably do not cure any disease although they provide a shieldlike buffer or protective action against a wide variety of irritants.[69] Furthermore, while they inhibit the production of fibroblasts throughout the body they rarely interfere with wound healing when given in usual dosage and they do not produce the lysis of existing granulation tissue.[74] Nevertheless it may be advisable to delay the extraction of teeth during the administration of large doses in order to

68. Sprague, R. G.; Power, M. H., and Mason, H. L. Physiologic effects of cortisone and pituitary adrenocorticotropic hormone (ACTH) in man. J.A.M.A. 144:1341 (Dec. 16) 1950.

69. Hench, P. S. The reversibility of certain rheumatic and nonrheumatic conditions by the use of cortisone or of the pituitary adrenocorticotropic hormone. Ann. Int. Med. 36:1 (Jan.) 1952.

70. Berthrong, M.; Rich, A. R., and Griffith, P. C. Study of effect of adrenocorticotropic hormone (ACTH) upon experimental cardiovascular lesions produced by anaphylactic hypersensitivity. Bull. Johns Hopkins Hosp. 86:131 (March) 1950.

71. Berthrong, M.; Rich, A. R., and Bennett, I. L., Jr. The effect of cortisone upon the experimental cardiovascular and renal lesions produced by anaphylactic hypersensitivity. Bull. Johns Hopkins Hosp. 87:549 (Dec.) 1950; 88:197 (March) 1951.

72. Mogabgab, W. J., and Thomas, L. The effects of cortisone on bacterial infection. J. Lab. & Clin. Med. 39:271 (Feb.) 1952.

73. King, E. Q., and others. Tuberculosis following cortisone therapy. J.A.M.A. 147:238 (Sept. 15) 1951.

74. Norcross, B. M., and others. The effect of cortisone and ACTH on the histopathologic lesions of rheumatoid arthritis. Ann. Int. Med. 36:751 (March) 1952.

avoid the possible inhibition of production of granulation tissue in "dry sockets" and the possibility of favoring infection of blood clots as well.

PREVENTION OF DISEASES AND CONDITIONS DUE TO FOCAL INFECTION

Since the extirpation of accessible primary foci of infection, with or without follow-up therapy, may prove ineffective insofar as complete recovery is concerned, both physicians and dentists should have a deep interest in the prevention of conditions and diseases due to focal infection. Certainly surgeons and dentists should carefully avoid creating foci of infection unnecessarily. It is always likely to be true that it is easier to prevent the diseases of focal infection by the prompt and adequate treatment of primary foci of infection than it is to relieve or cure them when once well established. This is particularly true with regard to subacute bacterial endocarditis in which dentists have a special responsibility since so many instances of the disease may be traced to focal infection of dental origin. Physicians should not only see to it that all patients with rheumatic, hypertensive and other types of valvular and congenital heart disease receive periodic dental care but also that the dentists concerned are informed of the existence of these types of heart disease in their patients. Dentists, in turn, should have a keen realization of their particular responsibility in keeping the oral cavity as free as possible of focal infections. If in doubt it appears far better to extract a tooth, or teeth, than to take chances on subacute bacterial endocarditis or some other grave disease of focal infection, not only because "an empty house is better than a poor tenant" but because of the present high excellence of restorative dentistry. Furthermore, it is always advisable to extract only one or two teeth at a time in order to reduce the chances of transient bacteremia to a minimum. Local anesthesia with procaine hydrochloride and a 1:25,000 dilution of epinephrine hydrochloride is to be preferred since the vasoconstrictive effects of epinephrine hydrochloride appear to reduce the incidence of postextraction bacteremia.[24, 75]

Chemoprophylaxis • In addition to other preventive measures chemoprophylactic treatment is also advisable. Daily doses of sulfadiazine or penicillin by ingestion during the colder months of the year may be employed for the prevention of beta streptococcus infections of the upper respiratory tract responsible for recurrent attacks of rheumatic fever. The only real solution in such cases is likely to be active immunization with vaccines prepared from certain types belonging to group A.

It is always advisable to attempt the prevention of bacteremia following extractions of teeth or removal of the tonsils, in patients with valvular or congenital heart disease, by the administration of a sulfonamide or antibiotic compound. While this is unnecessary in individuals with normal hearts, chemoprophylaxis has been advised for the prevention of exacerbations of rheumatic carditis following the extraction of teeth.[76, 77] It is also advisable for the prevention of exacerbations of iritis and other ocular diseases, neuritis and other diseases due to focal infection as well as for the prevention of infections in diabetes mellitus following extractions or tonsillectomy.

Various investigators have advised the administration of sulfonamide compounds before and after extractions or

75. Feldman, L., and Trace, I. M. Subacute bacterial endocarditis following the removal of teeth or tonsils. Ann. Int. Med. 11:2124 (June) 1938.

76. Taran, L. M. Rheumatic fever in its relation to dental disease. New York J. Den. 14:107 (March) 1944.

77. Northrop, P. M., and Crowley, M. C. The dentist's responsibility in the management of the patient with rheumatic heart disease. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 30:693 (Nov.) 1944.

other operations.[28, 78, 79] Since viridans or alpha streptococci and gamma streptococci are more resistant than beta streptococci, sulfonamide prophylaxis may prove ineffective.[80] Under the circumstances penicillin is to be preferred.[81, 31] However, since alpha or viridans and gamma streptococci are likewise more resistant to penicillin than beta streptococci and staphylococci, relatively large doses are indicated. For this reason it is advisable to administer at least 300,000 to 600,000 units of procaine penicillin G three hours before and immediately after extractions or tonsillectomies with a third dose the following day. Roth and his associates[82] have recommended the oral administration of aureomycin, on the basis that it is probably more effective than penicillin. Doses of 500 mg. are given every six hours, around the clock, on the day before, the same day (not earlier than three hours before surgical intervention) and the day after extractions or other surgical procedures.

DISCUSSION AND CONCLUSIONS

It is obvious that the era of "theory of focal infection" has long since passed since focal infection in the etiology of various systemic conditions and diseases is no longer a theory but a process or mechanism well established in both medicine and dentistry. Fortunately the era has also passed when focal infections were regarded as merely primary foci of infection accessible to surgical extirpation or drainage. It is also fortunate that the era of "focal infection delirium" with the wholesale and needless extractions of teeth or removal of tonsils has at least largely passed although many "sins of omission and commission" are still being committed in its name. On the other hand, the pendulum of opinion may be swinging too far in the opposite direction with unwarranted skepticism on the potential clinical importance of focal infection in the etiology of disease. This skepticism results in the regrettable chances of negligence on the part of both physicians and dentists.

Difficulties are frequently encountered in the detection of focal infections of potential or actual importance in the etiology of secondary systemic conditions or diseases. This does not detract from the clinical importance of focal infections although it indicates the great need for improved diagnostic methods and skill on the part of both physicians and dentists in their detection. Under present conditions it is still a common experience to find such striking differences of opinion on whether the teeth, tonsils or sinuses are or are not infected, that the incidence of focal infections in this or that disease reported in the literature are of but limited value. Certainly the failure to detect focal infections does not necessarily prove their absence, or disprove their previous presence. Greater care and improved diagnostic methods and skill on the part of both physicians and dentists will not only reduce the incidence of needless surgical procedures on the one hand, but result in an increased incidence of detectable focal infections on the other, of potential importance in relation to the present and future health of many individuals.

Undoubtedly the number of individuals who escape at least temporarily ill health due to focal infections is greater than the number developing various systemic conditions or diseases. This could not be

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otherwise. Even in epidemics and pandemics of infectious diseases many individuals escape infection. Since the microorganisms of focal infection are usually of reduced virulence, a high incidence of escape from ill health is both inevitable and expected. Furthermore, many individuals with detectable primary foci of infection may escape the conditions and diseases potentially due to focal infection, not only because of the presence of local nonspecific factors which prevent the absorption and distribution of pathogenic microorganisms or their soluble products, but because of adequate protection afforded by specific natural or acquired resistance and immunity. In addition, various other normal or adequate physiologic, metabolic, biochemical and hormonal activities contribute to this protection. Insofar as those diseases of focal infection resulting from transient periods of bacteremia are concerned, escape from secondary bacterial localizations or diseases may also be due to the absence of those factors favoring secondary localizations, such as alterations in capillary endothelium, capillary occlusions due to scarring or heredity, trauma, inflammation, excessive fatigue, and so forth. In other words, the matter of whether individuals with focal infections develop systemic conditions or diseases depends on the invasiveness and virulence of the living agents of disease on the one hand and resistance or immunity on the other, with the balance between them deciding the outcome. Reports in the literature questioning or minimizing the potential importance of focal infections in relation to rheumatoid arthritis, uveitis and other diseases, have nevertheless been based largely on the fact that the incidence of detectable or suspected primary foci of infection is almost as high in apparently healthy individuals or those with diseases unrelated to infection. Under the circumstances they are of little or no significance although, unfortunately, largely responsible for present day skepticism of the potential importance of focal infection in relation to health and disease.

As previously stated, part of this skepticism is also based on the fact that the surgical removal or drainage of focal infections is frequently without therapeutic benefit although not infrequently followed by improvement in general health. This is to be expected in the presence of multiple focal infections some of which have escaped detection and treatment. Such treatment likewise is without therapeutic benefit when primary foci of infection are inaccessible to surgical measures or complete disinfection, when the secondary disease is chronic and so well established as to be independent of the primary focus or foci of infection, and when chronic inflammatory or other changes due to infection or acquired bacterial sensitization are irreversible.

No one can deny that the prevention of diseases potentially due to focal infection is much more likely to be successful than their treatment once they have become chronic and well established. This places a well defined responsibility on both physicians and dentists from the standpoint of preventive medicine.

Roentgen ray cancer of the hands in dentists

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Undoubtedly, the danger to the hands of repeated irradiation by roentgen rays during the exposure of dental films has been pointed out emphatically to every dental student and every dentist. The small but persistent incidence of radiation damage in dentists, however, indicates that there must arise occasional circumstances in which some practitioners relax their usual caution and hold films in the mouths of their patients. If these exposures are too frequent or are continued over too many years, radiation sequelae are inevitable. The aims of this article are to reemphasize the danger, to describe the manifestations of radiation damage and to make suggestions regarding prevention and treatment.

MANIFESTATIONS OF RADIATION DAMAGE

The amounts of radiation which a dentist receives while holding dental films in place for a patient are too small to produce changes which are noticeable at first. It is only on repeated exposure over a considerable period, from four to 30 years, that the cumulative effects become manifest. The onset of the endarteritis, scarring, atrophy and neoplasia, which are the chief pathologic changes produced by the rays, is insidious.

The first symptom of radiation damage in dentists usually is a dryness and scaliness of the thumb and first two fingers of either or both hands. This is followed by a mottled discoloration which is caused by alternate areas of scar and telangiectasia. The diffuse scaliness gradually progresses to the formation of keratoses, which are discrete, hard projections of keratin. These are firmly adherent and when they are pulled off bleeding may occur. Loss of the covering epithelium through some minor trauma may cause persistent ulceration, while the repeated flexing of the hard, thick epidermis over a joint may produce painful fissures. Ulcers and fissures may become infected, and cellulitis may ensue.

The distribution of these changes is a highly characteristic feature of radiodermatitis in dentists. Because of the position of the hands while holding dental films in place, most of the radiation sequelae are localized in the thumb and the radial side of the index and middle fingers. These digits are involved most because they are nearest the center of the beam of roentgen rays. Paradoxically, the tip of the index finger, the structure that is in the exact center of the beam, is almost invariably spared (Fig. 1, 2). This is because this part is protected from the rays by the teeth, by the alveolar ridge and by the metal foil on the back

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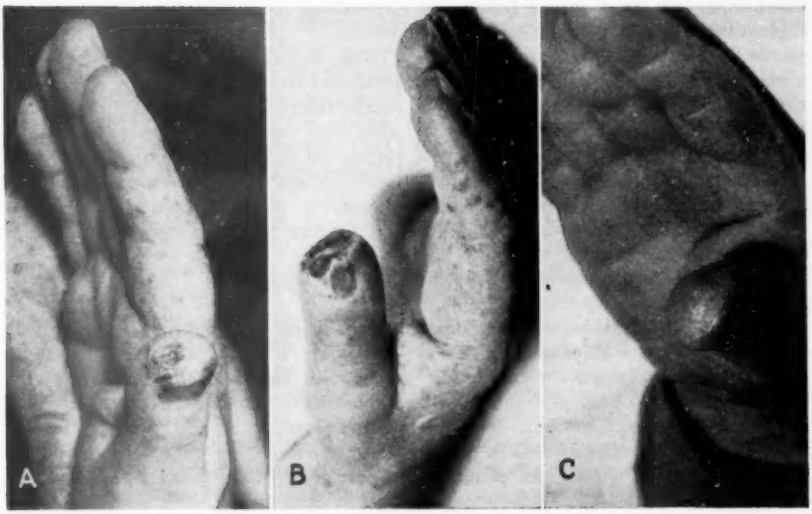

Fig. 1 • A: Squamous cell carcinoma of tip of thumb due to exposure to roentgen rays while holding dental films. Note keratoses on proximal part but not on tip of index finger. B: Granulation tissue at completion of chemosurgical excision of cancer which invaded tip of distal phalangeal bone. C: Healed lesion. No recurrence after 12 years; thumb is fully functional

of the dental film. The radiodermatitis usually is bilateral; but the right hand often is more severely involved, probably because of the more frequent use of the right hand in holding films in the anterior portion of the mouth where there is a choice of using either hand.

Another symptom of radiation overdosage is fissuring of the nails, due to damage to the matrix. This may lead to excessive thickening of the nail, piling up of horny material under the free portion of the nail, cleft formation and infection. The latter complication may lead to loss of the nail, but usually the nail is replaced (Fig. 2). The nail most likely to be involved is that of the thumb. Next common is the nail of the middle finger while the nail of the ring finger occasionally is slightly involved. The nail of the index finger is remarkably free as a result, of course, of the protection afforded by the teeth, bone and dental film.

Cancer often arises in keratoses, but it also may arise in nonkeratotic areas. It may be recognized by a growing indurated mass or by progressive ulceration. Often both manifestations are present. Histopathologically, the neoplasms are squamous cell carcinomas; hence there is the possibility of metastasis to the regional lymph nodes, particularly when the neoplasm is large and highly malignant.

The series used in this study includes the cases of 8 dentists who had sustained severe radiation damage; of these, 5 had carcinomas. In 3 of the latter group the distal part of the right thumb was involved (Fig. 1); in 1 the cancer was over the left proximal interphalangeal joint of the middle finger (Fig. 2); in another the tumor was over the middle phalanx of the index finger. Again, the

distribution of the cancers shows the highest incidence in the areas which have received the most direct and least filtered irradiation. No case of cancer on the distal part of the index finger was observed in dentists. In contrast, roentgen ray cancer in physicians is fairly common on the end of the index finger but it is common also on the dorsum of all of the fingers and of the hand itself; this difference in distribution is due to the different type of exposure received by physicians.

The time interval between exposure and the development of cancer is extremely variable because the rate of carcinogenesis varies with the dose, with the frequency of exposure and with individual sensitivity to the rays. The period of practice prior to the onset of cancer in patients observed by the author varied from 18 to 35 years, while the period preceding the appearance of scaliness and keratoses varied from nine to 32 years. These figures are misleading, however, because the exposures were not necessarily received from the start of practice and they were received over a period of years. In one case the initial symptoms were noticed only four years after the first exposures were received although the dentist had practiced for 10 years.

PREVENTION

It is obvious that the most effective way to avoid radiation sequelae is to avoid radiation. This is accomplished by having the patient or someone else hold the film. If the patient is a child or an uncooperative individual, the film may be held by a parent or other relative. Although the author himself has never observed radiation sequelae in dental assistants, these

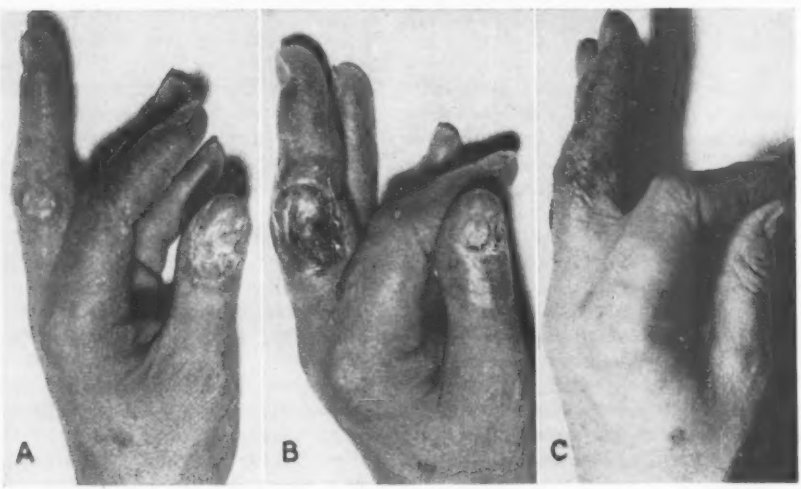

Fig. 2 • A: Squamous cell carcinoma over proximal interphalangeal joint of middle finger with roentgen ray damage to thumb and to index and middle fingers. Tip of index finger uninvolved. B: Granulation tissue after chemosurgical excision. Interphalangeal joint was closely approached but not damaged. C: Healed lesion. Function of finger nearly normal; no recurrence after five years. Note improvement in radiodermatitis

people should not be exposed repeatedly either. Every dentist should resolve never to hold dental film in place regardless of how much trouble it may be to get someone else to do it for him. Of course, lead-lined gloves would be protective; but they would be clumsy to use in the mouth.

TREATMENT

If symptoms have already made their appearance, there already is irreversible damage; but proper care can prevent the development of disabling complications. The most essential part of treatment is immediate and complete cessation of exposure. Under no circumstances whatever should further roentgen irradiation be allowed. Neither should the damaged parts be exposed to undue amounts of ultraviolet radiation either from the sun or from artificial sources, for ultraviolet and roentgen rays are known to be additive in their carcinogenic effects. Additional scarring from trauma or from infection should be avoided as much as possible.

As soon as dryness and scaliness make their appearance, a small amount of oily lotion or cream should be used to replace the normal skin secretions, which are deficient as a result of damage to the sebaceous glands. Preparations such as lanolin and olive oil may be used for this purpose. Superfatted soap reduces drying caused by frequent washing.

When keratoses appear they should not be allowed to build up to a point where they become irritating on account of pressure, maceration and frequent trauma. They may be pared down with a sharp scalpel or sanded down with a sandpaper disk. If keratoses show evidence of proliferative activity as indicated by induration at the base or by crusting they should be removed more deeply. This may be accomplished by means of electrodesiccation or by cauterization with a keratolytic such as dichloroacetic acid; the author prefers to remove them by the chemosurgical technic which allows for microscopic study to determine whether or not incipient cancerous change has occurred.

Small excoriations, fissures or ulcers usually will heal satisfactorily if they are protected by a crust produced by the application of an aqueous solution of merbromin (Mercurochrome). Stronger antiseptics such as tincture of iodine or other alcoholic solutions are to be avoided. Small dry dressings may be used to protect against abrasion. Ointments should be used sparingly if at all because of the maceration and dermatitis they may produce. For larger ulcers, scarlet red ointment-impregnated gauze, in which the meshes are open, often is useful to stimulate epithelization, to provide antisepsis and to afford protection to the delicate proliferating epithelium. This type of dressing is especially indicated for ulcers over joints because of the softening and lubrication provided by the incorporated ointment.

If there is persistent ulceration or induration which is suspected of being cancer, immediate removal and microscopic examination is indicated. Radiation therapy, either by radium or by roentgen rays, is contraindicated because the tissues already have received excessive doses. Excision with the cold knife may be indicated in some cases as, for example, for the removal and subsequent grafting of areas of extensively damaged skin with incipient malignant change. Amputation may be necessary if the digit has been so extensively involved that a usable member cannot be preserved by more conservative excision. Surgical dissection of regional nodes is indicated if metastasis has occurred or if the primary lesion is so large and highly malignant that metastasis is thought likely to have occurred. Electrosurgical excision of the primary lesion is not often indicated because healing following its use is not favorable in the presence of the radiation damage and, moreover, the destruc-

tion of the excised tissues by the heat makes adequate microscopic diagnosis impossible.

The most reliable and at the same time the most conservative method of treatment is chemosurgery. This new technic provides complete microscopic control of excision by means of a process consisting of the following steps: (1) chemical fixation *in situ* of the tissues suspected of being cancerous by means of a paste containing zinc chloride, (2) excision of a layer of the fixed tissue, (3) location of the cancerous areas by systematic microscopic examination of frozen sections of the excised tissues, (4) further chemical treatment limited to the areas demonstrated to be cancerous and (5) repetition of the process until the cancer, including all its irregular extensions, has been entirely excised. A general description of this method has been published[1, 2, 3] as well as a specific description as it relates to the treatment of cancer of the extremities.[4] The most important feature of the technic is the microscopic control which makes it possible to follow out selectively the "silent" extensions from the main mass of cancer. Thus, the cancer may be excised with unprecedented reliability coupled with maximal conservation. The conservation is economically important to dentists because it enables the preservation of usable thumbs (Fig. 1) and fingers (Fig. 2).

This series includes the cases of 8 dentists who sustained severe radiation damage to their hands. Of this group 5 had carcinomas which were chemosurgically excised. Of these cancers, 3 involved the tip of the right thumb (Fig. 1), 1 affected the middle phalanx of the right index finger and 1 was located over the proximal interphalangeal joint of the left middle finger (Fig. 2). Four of these cases have remained healed with functional digits for periods of from one to 12 years. One patient was not cured because of isolated metastatic foci in the lymphatic vessels up to the level of the wrist and because of metastasis in the axillary lymph nodes. In this last case there had been a persistent ulceration on the thumb, but there was little definitely discernible mass or induration. Yet the entire distal half of the thumb was found to be involved by a highly malignant carcinoma and metastases were present. The patient refused radical amputation until it was too late. This case illustrates how potentially dangerous these radiation sequelae may be.

SUMMARY

The exposure of the thumb and first two fingers of dentists from the repeated holding of dental films in the mouths of their patients may lead to radiation damage. This may be manifested by dryness, scaliness, fissuring, ulceration, telangiectasis, atrophy, keratoses and squamous cell carcinoma. Prevention is effected by scrupulous avoidance of exposure. Treatment of the dryness and scaliness is by the sparing use of oily lotions or creams. Fissures, abrasions and ulcerations are treated by producing a crust with Mercurochrome, by dry protective dressings or by scarlet red ointment-impregnated gauze dressings. Keratoses may be treated by electrodesiccation or by chemical cauterization, preferably with microscopic examination if there is any suspicion of malignancy. Cancer may be treated with surgical, electrosurgical or chemosurgical intervention. The last method with its complete microscopic control of excision has the advantages of unprecedented reliability and maximal conservation. Treatment with radium or roentgen rays is contraindicated.

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The dental use of mephenesin in cerebral palsy patients: a preliminary report

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For many years the dental care and treatment of cerebral palsy patients has been an arduous and difficult task—difficult in the sense that few practitioners actually understood the vital need for dental care for these children. Likewise difficult was the mental attitude of the dentist concerning the management of the unforeseen actions and movements of the patients.

Briefly, cerebral palsy is a disability involving the nerves and muscles that govern muscular control, resulting from an injury to some portion of the brain. The site of the injury in the brain determines the type of cerebral palsy. On this basis, cerebral palsy manifests itself in various forms, as rigidities, ataxias, tremors, high spinal lesions, and spastic, athetoid, or mixed conditions. Eighty-five per cent of the persons with cerebral palsy are spastics and athetoids.

Spasticity means that the muscles invariably contract and the patient exhibits a "stretch reflex." The athetoids are always in constant involuntary motion. Spastics are shy, sensitive and are introverts by nature, while athetoids are the exact antithesis, being extreme extroverts by nature, not caring what people say about them.

Cerebral palsy is evident in the population to the extent that there are seven cerebral palsy patients out of every 100,000 children born. Of these seven, one dies by the time he reaches 6 years of age. There are two that are mentally deficient and must be institutionalized. One child is so slightly handicapped that with proper physiotherapy he becomes assimilated into the normal child pattern. One child is bedridden and must remain at home. The remaining two need not be confined to the home. The last four children are the ones that are most likely to be seen in dental practice. Many of these children are unable to retain their jaws in one position for a long period of time. They can close their jaws with the strength of a vise and make it extremely difficult and hazardous for the dentist to do any work.

More than a thousand patients have been treated for the past five years at the Philadelphia Society for Crippled Children with certain methods of treatment. These methods have proved conclusively that cerebral palsy children can be provided with dental care.

During the operative phase it would have been of great help in some instances if relaxation could have been provided by some agent for easier and more effective handling. It must be remembered, however, that cerebral palsy children do not have the ability to swallow properly and in general cannot be given capsules

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or tablets. Furthermore, some drugs are ineffective when given orally. Morphine injections used in ordinary operative work to bring about relaxation are not desirable for these children. Barbiturates also because of certain untoward after-effects are not desirable. An ideal drug for this purpose would produce relaxation or sedation without causing stupor or hypnosis. It should be effective orally and preferably be in elixir form. It should have no or little toxicity and few undesirable side reactions.

A relatively new drug which is primarily a muscle relaxant but also has some sedative-like action seems to have these advantages. This drug, alpha-beta-dihydroxy-gamma (2 methylphenoxy) propane (mephenesin[1]) was introduced in Great Britain in 1946 by Berger and Bradley.[2] It has been clinically demonstrated that mephenesin depresses abnormal activity of skeletal muscle but has no influence on voluntary muscular movement.[3,4] In addition, mephenesin seems to have a sedative-like effect which has proved useful as an adjunct in the treatment of anxiety tension states[5] and in treating certain psychiatric patients.[6,7] A unique feature of this drug is that in therapeutic doses it has no depressant effect on the cerebral cortex and patients remain coherent and cooperative during treatment.

As an aid in ameliorating abnormal neuromuscular mechanisms, mephenesin can be useful in treating patients with spasticity, rigidity and tremor, as in parkinsonism, paraplegia, multiple sclerosis, in brain and cord injuries;[3,4,8] it has also been useful in treating cerebral palsy, particularly the athetoid type.[9] Reduction in spasticity is not accompanied by motor weakness, but the effect of the drug is of short duration in most instances. Mephenesin has been found beneficial also in treating low-back pain (true muscle spasm) and pain associated with nerve root compression.[10] Tetanus convulsions can be effectively controlled with the drug.[11] Mephenesin has a local anesthetic action also but this is of a transient nature. Mephenesin is effective intravenously as well as orally and has been described as "remarkably free of toxicity."[12] There appears to be a lack of knowledge about any chronic toxicity occurring. For some unknown reason, it appears that a severe reaction follows its use with the barbiturates. However, no other contraindications are known. It can be given orally for long periods of time without fear of building up a tolerance to the medication.

ADMINISTRATION AND CLINICAL OBSERVATIONS

After intravenous administration, relief of muscle spasm, of rigidity and of tremor can be obtained almost instantly; but capsules or tablets require about 20 minutes for a response. The elixir of mephenesin is absorbed more rapidly and may give a more even response than capsules or tablets. Unlike curare, the

1. Mephenesin (Tolserol) used in this study supplied through the courtesy of E. R. Squibb & Sons Pharmaceutical Co., New York.

2. Berger, F. M., and Bradley, W. Pharmacological properties of α, β dihydroxy- γ-(2 methylphenoxy) propane (myanesin). Brit. J. Pharmacol. 1:265 (Dec.) 1946.

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5. Dixon, H. H., and others. Clinical observations on Tolserol in handling anxiety tension states. Am. J. M. Sc. 220:23 (July) 1950.

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11. Santemma, E. E., and Graham, G. C. Tolserol in tetanus. New York State J. Med. 50:2731 (Nov. 15) 1950.

12. Henneman, E.; Kaplan, A., and Unna, K. A neuropharmacological study on the effect of myanesin (Tolserol) on motor systems. J. Pharmacol. & Exper. Therap. 97:331 (Nov.) 1949.

drug is almost completely metabolized and little is put out in the urine uncombined; a conjugation product is demonstrable in the urine within a short time after administration.

Mephenesin will bring about a feeling of relaxation, euphoria, and freedom from nervousness. It produces dryness of the mouth and in some patients may cause nausea and vomiting, particularly if given when the stomach is empty. With larger doses the patient may experience a blurring of vision; and when given too rapidly by injection, mephenesin may produce increased reflexes and the patient may go through what appears to be decerebrate rigidity.

The relaxant effect of the drug disappears usually in about 40 or 50 minutes and for certain patients several doses per day have to be given for sustained effect.

TECHNIC AND DOSAGE

Mephenesin may be given intravenously or orally. By injection, a 2 per cent solution is considered safe and about 50 to 150 cc. is required to bring about a reduction of abnormal neuromuscular mechanisms. For this purpose the drug is administered at the rate of 30 drops per minute, the dosage to be increased subsequently according to needs. Horizontal and vertical nystagmus occurs with effective therapeutic levels. Intramuscular injections have proved unsuitable because the high amounts of the drug required for most purposes may produce necrosis of tissue along with severe inflammatory reactions.

Orally, mephenesin may be given in tablet, capsule or elixir form. The onset of action is most rapid with the intravenous preparation but the oral products produce a longer lasting effect. The dosage varies considerably according to the result desired. The literature mentions single doses of from 1 to 6 Gm. for adults. In this study the elixir of mephenesin was the preferred form (10 per cent) and the average dose was 1 teaspoonful for every 50 pounds of body weight (corresponding roughly to 0.5 Gm. per 50 pounds). Syrup of wild cherry was added to make the solution more palatable.

DETAILS OF EXPERIENCE

In view of other clinical experience and various reports concerning the effects of mephenesin, it was found desirable to give the drug a trial for its relaxant effect on cerebral palsy patients submitting to dentistry since these patients are extremely difficult to handle without relaxant medication. Therefore, a select group of 35 children at the Philadelphia Society for Crippled Children and Adults was given a course of treatment with mephenesin.

An important consideration in the treatment of these children was their inability to swallow properly. Since diets consisted of liquid, soft or semisoft foods, the logical method in the administration of mephenesin was the elixir form.

The 35 patients, varying in age from 2 to 34, represented all types of cerebral palsy cases. Some were able to seat themselves in the chair; others had to be seated on the lap of the parent before dental work could be done.

Since previous dental work had been performed on these patients, sometimes under difficult conditions, their actions under treatment with and without mephenesin could be compared. Some children gagged or coughed on taking the medicine. One patient persisted in coughing for a week. Two of the patients liked the taste of the mephenesin. Still another difficulty encountered was the fact that many patients could not answer questions, and any information desired had to be secured by observing the children and questioning the parents.

After the administration of the mephenesin, a waiting period ranging from 10 minutes to 50 minutes was

allowed before any dental work was performed. The best results were those obtained after waiting 25 to 30 minutes. All the children exhibited dryness of the mouth within 15 minutes after the administration of mephenesin. This condition was temporary, lasting only 15 or 20 minutes; however, much work could be done during this dry state. The saliva, when it reappeared, was not as profuse as it was before the administration of the mephenesin.

Mephenesin in every instance produced a state of euphoria, relaxation and well-being. The degree of relaxation varied according to the patient. Many of these same children when treated without mephenesin were extremely taxing on the dentist as well as on the parent, for they kicked and moved their feet and hands in all directions. After the mephenesin was administered, the movements ceased and the dentist's work was more pleasant.

Nausea resulting from the mephenesin occurred in only four instances. Two patients vomited after the operative work, and two children became nauseated when they arrived home.

When mephenesin was used prior to an extraction, the patient became extremely relaxed and did not mind undergoing further treatment.

It is interesting to note that mephenesin has an anesthetic effect on the taste buds of the tongue and on the throat. One of the patients smoked a cigarette after a dose of mephenesin and had no sensation of tasting the tobacco. The anesthetic effect persisted for a long period of time. This side effect of mephenesin could prove useful in other forms of dentistry.

Patients who were given the drug on repeated visits showed the same effect of relaxation and, as a whole, manifested no reaction to the mephenesin. There were two patients, however, who gagged slightly after the second dose of mephenesin; but this undesirable reaction was temporary and did not recur with repeated doses.

The relaxation produced in these children by the mephenesin was most gratifying. The patients became quieter within 10 minutes from the time of the initial dose. Working on cerebral palsy children was easier, and the operating time was decidedly extended. Any fears the patients had of undergoing dental treatment were tremendously reduced.

CASE 1

A 3 year old female child, weighing 35 pounds, with ataxia form of cerebral palsy, was given mephenesin before dental treatment.

Prior to treatment the patient was obstreperous and difficult to manage. It required several people to hold her down while she was treated. After the administration of 1 teaspoonful of mephenesin elixir it was easy to work on the child. The patient cried, but this did not in any way affect the degree of relaxation, which was excellent. No aftereffects or symptoms were noticed except that the patient seemed to be a little drowsy. The mephenesin was first tried in orange juice, but this was not too successful.

Subsequent doses of mephenesin produced similar results.

CASE 2

A 34 year old male, weighing 134 pounds, with athetoid form of cerebral palsy, was treated with mephenesin.

This patient was given a dose of mephenesin at 7:15 P.M. At 7:30 P.M. the oral cavity was completely dry. The saliva did not return to its normal flow until 7:50 P.M. The patient began to relax within 10 minutes after the mephenesin was administered. He felt completely relaxed at 7:45 P.M., approximately 30 minutes after the administration of the mephenesin. The muscles of his face were less rigid, and walking was much easier. All the patient's movements

Table • Administration and effect of mephenesin in the treatment of cerebral palsy

Sex	Age	Type of cerebral palsy	Weight in pounds	Dosage* in grams	Premedication time† in minutes	Degree of relaxation	Behavior as affected by mephenesin
F	2	Athetoid	20	7.7	25	Poor	Stopped crying, became quiet
M	2	Spastic	32	3.85	30	Fair	Stopped kicking
M	3	Spastic	52	7.7	50	Good	Became more relaxed
F	3	Spastic	25	3.85	45	Good	Slept well after first treatment
M	3	Spastic	40	7.7	20	Good	Wanted supper after treatment
F	3	Ataxia	35	7.7	30	Excellent	Became slightly drowsy
M	3½	Athetoid	27	3.85	31	Excellent	Became quiet, was nauseated on arriva home
F	3½	Spastic	28	7.7	30	Poor	Cried a great deal
M	4	Spastic	38	11.5	30	Excellent	Gagged on medication
M	4	Spastic	30	7.7	25	Excellent	Was well behaved and relaxed entire time
M	4	Spastic	39	7.7	11	Excellent	Cried a little but was cooperative
F	5	Spastic	30	7.7	30	Excellent	Was responsive
M	5	Ataxia	40	7.7	20	Excellent	Was responsive without anesthesia
M	5	Spastic	35	11.5	18	Fair	Was not drowsy
F	5	Rigidity	30	11.5	25	Excellent	Was relaxed
F	5	Spastic	60	7.7	30	Excellent	Was a good patient, became extremely thirst
M	5½	High spinal lesion	38	7.7	25	Good	Was quiet
F	6	Spastic	35	7.7	50	Excellent	Was not drowsy
M	6	Spastic	41	7.7	30	Excellent	Was boisterous before, cooperative after
F	6	Spastic	40	7.7	30	Good	Was relaxed
F	6	Spastic	34	7.7	25	Fair	Cried but was better patient than before
F	6	Rigidity	50	7.7	28	Good	Presented no problem
F	7	Spastic	55	7.7	25	Excellent	Coughed a little
M	7	Spastic	55	7.7	15	Excellent	Was well behaved; taste was affected
M	7	Spastic	50	7.7	20	Good	Disliked taste
F	7	Athetoid	35	11.5	20	Excellent	Presented no problem
M	8	Spastic	42	11.5	30	Excellent	Became quiet
M	8	Rigidity	60	7.7	15	Excellent	Was well behaved
M	8½	Spastic	40	7.7	25	Good	Vomited after treatment
M	9	Athetoid	54	7.7	30	Fair	Was slightly more cooperative than before
M	11	Spastic	55	7.7	30	Excellent	Was completely relaxed during extraction
F	12	Athetoid	60	7.7	30	Excellent	Was extremely quiet
M	13	Spastic	65	11.5	30	Excellent	Was quieter, dentist had more working time
M	14	Spastic	55	7.7	25	Good	Was more relaxed than before
M	34	Athetoid	134	26.95	30	Excellent	Was relaxed while walking; speech was easier

*Dosage 0.5 Gm. (approximately 1 teaspoonful of liquid mephenesin) per 50 pounds of body weight.
†Premedication time: waiting time from onset of drug to beginning of dental work.

lacked the usual tension, and there appeared to be no excess motion. Relaxation time was excellent. Within 30 minutes from the time of swallowing the mephenesin, the patient's speech was more understandable and the tongue was more flexible. The patient attempted to smoke a cigarette two minutes after the mephenesin was given and found that he could not taste the cigarette. This topical form of anesthesia persisted for 22 minutes after the initial dose. The cigarette tip was not wet. At 8:15 P.M. the patient began to feel the customary movements returning. By 9:00 P.M. he appeared to have thrown off the effects of the mephenesin.

SUMMARY

Mephenesin was used on all types of cerebral palsy children for the purpose of making them more relaxed during dental treatment. In all cases there was found to be some degree of relaxation and euphoria. Boisterous children became quiet and easier to handle. The dryness in the mouth, although of short duration,

was of some benefit to the dentist. Little of the nausea or side effect upsetting to a dentist occurred in the treatment of these children. Repeated doses produced similar effects and did not tend to build up a tolerance to the drug. The patients at all times appeared to be cognizant of what was going on. The accompanying table summarizes the administration and effects of mephenesin in the treatment of this experimental group of cerebral palsy patients.

CONCLUSION

Undoubtedly for the first time in the dental treatment of cerebral palsy patients, a drug has been found which is safe and harmless and yet produces a satisfactory degree of relaxation. Mephenesin enables the dentist, heretofore afraid of inflicting injury on himself and on the patient, to treat cerebral palsy patients successfully.

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Infectious mononucleosis: oral and dental pathosis as an etiologic factor

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Infectious mononucleosis, known also as glandular fever,[1,2] acute idiopathic lymphadenitis[3] and acute benign lymphoblastosis,[4] is a disease that often goes unrecognized by physicians and dentists alike. It is probably more common than generally believed. Failure to recognize its prevalence is due to its mildness in most cases, its protean clinical manifestations, and the inability of the examiner to make an etiologic diagnosis. The best that can be done is to make a presumptive diagnosis and to substantiate it with suitable laboratory procedures.

The purposes of this report are to review briefly certain features of infectious mononucleosis, with particular emphasis on those that are of interest to the dentist, and to present some of the data compiled in a study of 210 sporadic cases observed at the Mayo Clinic between January 1, 1937, and January 1, 1947.

HISTORICAL REVIEW

The history of this disease may be divided into four phases. The first begins with description of an idiopathic adenitis occurring in children by Filatow[5] in 1885. Pfeiffer,[1,6] four years later, termed the

Abridgment of thesis submitted to the faculty of the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the degree of Master of Science in Medicine.

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2. Wechsler, H. F.; Rosenblum, A. H., and Sills, C. T. Infectious mononucleosis; report of an epidemic in an army post. Ann. Int. Med. 25:113 (July); 236 (Aug.) 1946.

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5. Filatow, N. Diagnostic et semeiologic des maladies de l'enfance. Paris, 1889.

6. Pfeiffer, Emil. Drüsenfieber. Jahrb. f. Kinderheilk. 24:257, 1889.

entity Drüsenfieber (glandular fever) and thought it to be a specific disease of the lymph glands in infants and children. Other names led to confusion, and it was not until 1920, when characteristic changes in the blood were recognized, that the second phase of interest started. Sprunt and Evans[7] gave the disease the descriptive name infectious mononucleosis because of abnormal mononuclear cells which could readily be found in the peripheral blood of the patients. It was generally accepted that this name was superior to the others.

It was this second phase of interest that marked the close relationship of hematologic and clinical diagnosis. Downey and McKinlay[8] published a classic paper on the morphology of lymphocytes seen in this disease in 1923. Three distinct types of abnormal lymphocytes were described and illustrated with a color plate. Nothing of equal importance from a hematologic point of view has since been added.

The third phase of interest in infectious mononucleosis came in 1932 when Paul and Bunnell[9] found the blood serum had antibodies which they termed "heterophilic." Serum from patients with infectious mononucleosis contained these antibodies which could agglutinate sheep erythrocytes in a titre higher than the serum from normal individuals. Thus, another aid in diagnosis was added.

The most recent phase of interest in this disease is concerned with pathology. Deaths in this disease have occurred due to rupture of the spleen or other causes. Pathologists[10,11,12] have shown that the disease process is generalized which may alter the function of various organs. For years it was thought the disease was confined to the lymph nodes.

STUDY OF SPORADIC CASES

The distribution, epidemiology, clinical manifestations and complications, and laboratory findings in 210 selected cases of infectious mononucleosis seen at the Mayo Clinic from January 1, 1937, to January 1, 1947, were studied. These cases were selected on the basis of having either a positive blood smear or a positive heterophil agglutination test. A positive blood smear was later to be one in which the differential count showed at least 30 per cent lymphocytes of which a significant number were of the abnormal leukocytoid variety described by Downey.[13] A heterophil agglutination was considered positive when patients' serum contained agglutinins for sheep erythrocytes in a titre of 1:224. Features of special interest to the dentists are incorporated here.

Incidence • Incidence by age in this group ranged from 9 months of age to 68 years of age, with 59 per cent of the cases occurring in patients between the ages of 16 and 26 years. Ninety-three per cent were in patients under 35 years of age.

Studies showed that the incidence of infectious mononucleosis could not be categorically classified as a disease of any one certain economic or social group. While the student group is most often affected (34 per cent in this group), it should be suspected and sought for in any patient regardless of age, sex, race, or occupation. Males usually show a higher incidence of this disease, but in this study females were found to constitute 57 per cent of the 210 cases. There was little difference in the incidence by season, al-

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12. Ziegler, E. E. Infectious mononucleosis: report of a fatal case with autopsy. Arch. Path. 37:196 (March) 1944.

13. Downey, Hal. Personal communication.

though most investigators have noted an increase during the spring and fall when respiratory infections are most common. No racial immunity was noted, and it has been shown by others[14,15,16,2,17] that the Negro race is not immune to this disease.

Epidemiology • The etiologic agent of this disease is unknown, but the prevailing opinion is that it probably is of viral origin. No basis can be found for the opinions expressed by early investigators that a diphtheroid bacillus isolated from excised lymph nodes,[18] or organisms of the genus listerella (*Bacterium monocytogenes*),[19] or a protozoan of the genus toxoplasma,[20] or Vincent's organisms—found at times in faucial lesions of patients with infectious mononucleosis[21]—have a causal relationship to the disease.

While the etiology of infectious mononucleosis has never been determined, it is known that this disease is at times associated with other conditions. Influenza has been suspected by Nolan[22] as being so closely associated with infectious mononucleosis that he termed the illness "influenza lymphatica," where absence of a diagnostic heterophil agglutination did not indicate the former diagnosis. Primary atypical pneumonia may show serologic and clinical characteristics that are typical of infectious mononucleosis. Adams and his associates[23] reported this in 1946, and the implication that these two diseases may be related etiologically is being investigated currently by Mathieson.[24] Diseases of the central nervous system, benign lymphocytic choriomeningitis[25] and the Guillain-Barré syndrome,[26,27] have been shown to occur when the patient had unmistakable evidence of infectious mononucleosis.

Diseases of the oral cavity are frequently associated with this disease. Vincent's infection has been proposed as a factor in etiology because of its presence in oral and pharyngeal lesions of infectious mononucleosis, but investigations have not been conclusive. The general feeling has been that circumstances which lower the body's resistance to one infection may allow the other to occur also. Wechsler and associates[2] reported that 67 per cent of 111 patients with infectious mononucleosis showed an increased number of Vincent's organisms, while 41 per cent of 104 patients showed pharyngeal smears with hemolytic streptococci. In this study, smears and cultures of the oral cavity were rarely done, so the figures would have little significance.

The possible etiologic relationship of infectious mononucleosis to dental extraction as far as known has been referred to only by Spangenberg in 1940.[28] Farley[29] mentioned the onset of infectious mononucleosis four days after a tooth extraction and Cottrell[30] reported one case

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15. Johnson, R. D. Infectious mononucleosis in the negro. J.A.M.A. 124:1254 (April 29) 1944.

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17. Werlin, S. J.; Dolgopol, V. B., and Stern, M. E. Infectious mononucleosis—a diagnostic problem. Am. J. M. Sc. 201:474 (April) 1941.

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27. Ricker, W.; Blumberg, A.; Peters, C. H., and Widerman, A. The association of the Guillain-Barré syndrome with infectious mononucleosis. Blood 2:217 (May) 1947.

28. Spangenberg, H. D., Jr. Recovery from the removal of an impacted third molar complicated by infectious mononucleosis (abstr.). J. D. Res. 20:244, 1941.

29. Farley, D. L. Acute infectious mononucleosis. M. Clin. North America 21:1139 (July) 1937.

30. Cottrell, James E. Infectious mononucleosis. J. Periodont. 9:15 (Jan.) 1938.

with an inflamed partially impacted third molar, but no correlation between the two events was implied. Stafne[31] states that he has encountered infectious mononucleosis with sufficient frequency in young adults that have third molars in the process of eruption and concurrent cervical adenopathy to give him a high index of suspicion regarding the presence of this disease. He adds, however, that each of his patients had a small necrotic, ulcerative lesion of the gum over the site of the erupting tooth.

The association of dental sepsis or dental extraction with infectious mononucleosis in the group of 210 patients studied, while not striking, warrants more attention than has heretofore been given. Five patients out of 210 volunteered the information that the symptoms of which they complained on admission had their onset from 3 to 21 days following the extraction of an infected tooth. Three other patients when seen on admission were found to have periapical abscesses of one or more teeth. These 8 patients, or 3.8 per cent, were all found to have infectious mononucleosis as the primary illness, according to the criteria established for diagnosis of this disease. It is of interest to note that one of the patients gave a history of having had infectious mononucleosis diagnosed by his local physician with two relapses. Because of a third recurrence of infectious mononucleosis he was seen at the clinic. The diagnosis was confirmed, but on questioning it was found that during the preceding five month period toothache had been one of his main complaints. Pain ceased a few days before he reported at the clinic. Examination demonstrated a periapical abscess that had ruptured. The involved tooth was extracted, and recovery was uneventful, without further evidence of infectious mononucleosis. The probability of chance association between this condition and infectious mononucleosis seems more logical than attempting to draw any etiologic conclusions. On the other hand, the same may be said here as was stated in the association of this disease with Vincent's infection; that is, the circumstances which predispose to Vincent's infection may likewise predispose to infectious mononucleosis. Whether this is because of a general lowering of the resistance to these infections is unknown. Nevertheless, in evaluating mandibular and cervical lymph node enlargement, care should be taken by both the physician and the dentist to consider conditions other than dental sepsis. Infectious mononucleosis should be excluded as a possible associated illness when a patient complains of enlarged cervical nodes following postoperative dental procedures although infection seems not to be a factor, or when a tooth either erupted or unerupted gives pain and there is an associated cervical adenopathy.

Clinical Manifestations • The most characteristic feature of infectious mononucleosis is the wide variability and severity of clinical manifestations experienced by the patient. The onset was insidious in 58.5 per cent in this group. The incubation period could not be determined. It was noted, however, that in 109 patients, an average of 11.9 days elapsed from the date of the first symptoms until attention was sought. Occasionally, the disease was encountered in the course of routine physical examinations where the patient was asymptomatic.

In those patients who were referred to the clinic, an admission diagnosis of infectious mononucleosis was made in only 7.9 per cent. Four other diagnoses were more frequent. These, in order of frequency, were: acute follicular tonsillitis (19 per cent); acute pharyngitis (13.6 per cent); influenza (10 per cent); leukemia (8.1 per cent). There were many other diagnoses which serve only to

31. Stafne, E. C. Personal communication.

emphasize the protean nature of this disease.

Respiratory manifestations were predominant features in this group. Sore throat was the outstanding complaint (52 per cent), while headache (35 per cent), fever (34 per cent), and painful cervical adenopathy (26 per cent), followed in frequency. Physical examination showed that cervical adenopathy, often unilateral, was the most common finding in 76.2 per cent of the patients. Exudative or membranous lesions on the tonsils or pharynx were noted in 40 per cent. Edema of the oral and pharyngeal mucosa and lymphoid hyperplasia caused dysphagia in 12.4 per cent of the patients. Stomatitis was observed in 3.8 per cent of the cases, and was at times accompanied by gingivitis. Nine patients showed a great increase in the number of Vincent's organisms in faucial lesions, while in 23 patients, beta hemolytic streptococci were cultured from the pharynx. Only a few smears or cultures were made of faucial lesions, so figures of organisms found should be interpreted in this light.

The resemblance of infectious mononucleosis to common upper respiratory infections was so great that diagnosis of these more common illnesses was often made. Chills ushered in the disease in 17 per cent of the cases, rhinitis in 5 per cent and extreme dyspnea in 5 per cent. Fever of varying degrees was present in almost every case at some time during the course of the disease. The peak of the fever occurred on the first and second day of the disease in 45 per cent of the cases, while in a number of instances the highest elevation occurred as late as the twentieth or twenty-first day. The highest fever encountered was 105°F. The average duration of fever was between 9 and 15 days.

Gastrointestinal manifestations were frequent. Splenomegaly (43 per cent) and hepatomegaly (15 per cent) have been observed by others, and jaundice was noted in 14 of the patients in this study. Abdominal pain was the chief complaint in 14.8 per cent of the cases and in two instances surgical exploration was done, only to find mesenteric adenitis.

Neuromuscular manifestations were likewise varied. Musculoskeletal aching and headache occurred frequently. Cervical rigidity, most often secondary to painful, enlarged cervical lymph nodes and rarely due to meningeal involvement, was encountered. Somnolence, vertigo and visual disturbances were also noted. In one case the clinical appearance was that of meningo-encephalitis, while in another delirium was one of the features.

Dermatologic manifestations occurred in 16 of the 210 cases. These were varied in appearance. Maculopapular polymorphic, urticarial, vascular, morbilliform, hemorrhagic and nodular skin rashes appeared at any time during the disease, but bore no relation to the clinical course.

Edema of the eyelids and periorbital tissues was noted in 14 patients. Photophobia, lacrimation and conjunctivitis were found in several instances.

Relapses occurred within a four months' period in three instances where dental sepsis was the major physical finding. The average interval between the initial illness and a relapse was 21 to 25 days. Recurrence, meaning a second attack with the interval period between attacks (measured in months or years) being subjectively and objectively free of manifestations of the disease, was rare. Only two patients in this study could be classified as having recurrences, and eight months was the interval between attacks.

Laboratory Findings • Study of the peripheral blood smear was the most valuable diagnostic procedure. In 96.6 per cent of these cases a significant increase in the atypical leukocytoid forms of lymphocytes was found. In more than half of these cases a blood smear characteristic of infectious mononucleosis was obtained by the eighth day of the disease,

while the average for all cases was 13.6 days. Had serial smears been taken of the blood, probably all of the cases would have shown a significant number of abnormal lymphocytes.

Anemia is not characteristic of infectious mononucleosis, and in this series only 5.5 per cent were found to have a hemoglobin below 11 Gm. per hundred cubic centimeters of blood. Unless it is known that the patient had anemia prior to the onset of the illness, the diagnosis of leukemia should be carefully considered.

Total leukocyte counts obtained varied between 600 leukocytes per cubic millimeter to 42,000. In general, the higher the leukocyte count the more severe the clinical course. Agranulocytosis occurred in one of the cases, a 65 year old male, whose total leukocyte count was 7,600 cells per cubic millimeter. The differential count showed 96.5 per cent lymphocytes (the majority being leukocytoid), and 3.5 per cent monocytes. Four days later neutrophils reappeared in the peripheral blood and the subsequent course of the disease was uneventful.

In these sporadic cases it was found that the aggregate counts of total leukocytes did not follow a trend followed in several cases: leukopenia occurring in the early stages of the disease followed by a gradual return to normal values. Neutropenia was usual in the early stages with lymphocytes chiefly accounting for the leukocyte elevation.

While a lymphocytosis of 50 per cent or more is expected at some stage of the illness, the occurrence of the atypical forms in the majority of the lymphocytes is most significant. The average degree of lymphocytosis in these patients was between 65 to 70 per cent. Two cases demonstrated a lymphocytosis above 95 per cent.

The sheep erythrocyte agglutination test (heterophil agglutination) reached a significant titre in 90.8 per cent of 142 patients in which this test was performed. The highest titre encountered in this series was 1:7,168. Most of the elevated heterophil agglutination titres occurred after the seventh day of the disease, and in 51.4 per cent a significant elevation was demonstrated by the fifteenth day. It should be emphasized that the elevation in titre was at times temporary, and unless blood was obtained for frequent determinations, this test was not of diagnostic value. In this laboratory, a titre of 1:224 or above is considered of diagnostic value.

SUMMARY AND CONCLUSIONS

A brief historical review of infectious mononucleosis has been presented.

An abbreviated report of a study of 210 sporadic cases of infectious mononucleosis seen at the Mayo Clinic between the years 1937 and 1946, inclusive, is given. Particular emphasis is placed on features which are of interest to the dentist.

Infectious mononucleosis is a disease of unknown etiology that may be associated with diseases of the oral cavity.

The probability of a chance association between this disease and diseases of the oral cavity seems more logical than attempting to draw any etiologic conclusions.

In evaluating mandibular and cervical lymph node enlargement following surgical dental procedures, yet where infection seems not to be a factor, infectious mononucleosis should be considered.

In cases of infectious mononucleosis, the oral cavity should be examined for possible dental pathosis.

The most important findings on which to establish a diagnosis of infectious mononucleosis are: (1) increase in the number of lymphocytes, with significant number of them being atypical leukocytoid forms; (2) either a rising titre of heterophil antibody or an already established high titre. Clinical findings are too diverse to serve as final criteria on which to establish a diagnosis of infectious mononucleosis.

Analgesic action of a sublingual saccharin-aspirin compound

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This study was undertaken to investigate the analgesic action of a sublingually administered saccharin-aspirin preparation[1] which previously has been reported as having unusually prompt and profound clinical analgesic activity.[2, 3]

METHODS

The pain threshold was determined for 100 test subjects, 36 males and 64 females, aged 15 to 55, by the Hardy-Wolff-Goodell technic[4-12] before and three minutes after the sublingual administration of two saccharin-aspirin tablets. Each tablet contained 5 grains of aspirin with saccharin in addition to the easily disintegrating filler. Forty control subjects, 13 males and 27 females, aged 16 to 58, were similarly studied before and three minutes after the sublingual administration of two control tablets. These tablets were identical with the experimental medication except for the absence of aspirin and were the same size as the medicated tablet with additional filler taking the place of the aspirin. Determinations of the pain thresholds of 71 of the treatment subjects and 27 of the control subjects also were made 10 minutes after the medication was utilized.

RESULTS

The average pain threshold for each group at the different time periods, together with the standard deviations, appear in Table 1. The standard deviations of the average differences for each individual at the three and 10 minute read-

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Table 1 • Pain thresholds (millicalories) before and after medication

Group medication	Before medication		After 3 min.			After 10 min.		
	Mean	σ	Mean	σ	σΔ	Mean	σ	σΔ
Aspirin-saccharin	227.2	24.4	229.9	32.1	9.1	233.1	15.3	8.9
Control tablet	224.2	27.4	222.6	29.4	12.9	225.4	29.5	10.5

σ = standard deviation of the mean.
σΔ = standard deviation of the average difference for each individual.

ings (compared with the initial readings) also appear in Table 1. The distribution of the pain thresholds, grouped according to the dol scale of pain intensity, appears in Table 2. In untrained subjects, as were used in this study, 14 millicalories (1 dol) represents the first discriminable step in pain perception. It will be noted from Table 2 that at the three minute period, 13 individuals in the experimental group (13.0 per cent) and 2 individuals in the control group (5.0 per cent) experienced an increase of at least 1 dol in pain threshold. The difference between these two percentages is not statistically significant ($\chi^2=1.9$; d=1). Similarly, at the 10 minute period, 21 individuals in the experimental group (29.5 per cent) and 4 individuals in the control group (14.8 per cent) experienced an increase (over the initial readings) of at least 14 m. cal. (1 dol) in pain threshold. The difference between these two percentages is not statistically significant ($\chi^2=2.3$; d=1).

DISCUSSION

According to the Hardy-Wolff-Goodell technic,[4] pain thresholds are measured in response to controlled radiant heat stimuli and are expressed in millicalories per centimeter[2] per second. In the Hardy-Wolff-Goodell dol scale of pain intensity, 14 m. cal. (1 dol) represents the first two of 21 discriminable steps in pain intensity discernible by trained subjects between the pain threshold and the maximum (ceiling) intensity of pain.[11,12] Untrained subjects are able to discern only one-half as many steps in pain intensity between the pain threshold and ceiling. Thus, there are only 10.5 divisions (dols) in the Hardy-Wolff-Goodell dol scale of pain intensity for untrained subjects.[11,12] The limit of ability of trained subjects to discriminate differences in intensity of stimulus near the pain threshold is about 5 m. cal.[13] The subjects used in this study, although oriented in the technic, were considered untrained according to the Hardy-Wolff-Goodell terminology. Individual determinations in such a group are somewhat less reliable than those obtained with trained subjects who have been studied repeatedly.

Following the administration of the saccharin-aspirin preparation, a slight increase in the average pain threshold was observed at both the three minute mark (2.7 m. cal.) and the 10 minute mark (5.9 m. cal.). These average increases in the pain threshold of the untrained subjects are not impressive in terms of clinical analgesic activity, since, even with

13. Hardy, J. D. Personal communication.

Table 2 • Distribution of patients according to pain threshold changes

Change from initial reading (millicalories)	Dols*	Aspirin-saccharin		Control	
		After 3 min.	After 10 min.	After 3 min.	After 10 min.
+(35 to 41)	2.5		1		
+(28 to 34)	2.0	1	4		1
+(21 to 27)	1.5	4	3	2	
+(14 to 20)	1.0	8	13		3
+(7 to 13)	0.5	18	13	4	3
+6 to −6	0.0	51	28	16	12
−(7 to 13)	0.5	17	7	16	7
−(14 to 20)	1.0	1	2	2	1
Total		100	71	40	27

*A dol is a unit of pain intensity.

trained subjects, a minimal pain threshold raising effect of less than 7 m. cal. (0.5 dol or 3 per cent) is most difficult to determine or interpret with certainty and is of slight clinical importance.

Although this and other studies[14,15] have not demonstrated a material increase in the pain threshold following the administration of aspirin preparations, the clinical effectiveness of salicylates in the relief or obtunding of certain types of pain certainly has long been acknowledged.[16] It is possible that the clinical effectiveness of this and other salicylate preparations cannot be measured adequately by the Hardy-Wolff-Goodell technic.

SUMMARY

At intervals of three and 10 minutes following its administration, sublingual saccharin-aspirin medication did not materially increase the cutaneous pain threshold to radiant heat stimuli as determined by the Hardy-Wolff-Goodell technic.

14. Birren, J. E.; Schapiro, H. B., and Miller, J. H. The effect of salicylate upon pain sensitivity. J. Pharmacol. & Exper. Therap. 100:67 (Sept.) 1950.

15. Sonnenschein, R. R., and Ivy, A. C. Failure of oral antipyretic drugs to alter normal human pain thresholds. J. Pharmacol. & Exper. Therap. 97:308 (Nov.) 1949.

16. Goodman, L., and Gilman, A. The pharmacological basis of therapeutics. New York, Macmillan Co., 1940, p. 227.

Speech and Civilization • Effective comparison and contrast are the basis for description and enumeration and the measure of intelligence. Some philologists and ethnologists have said, in effect, that all known human languages, either directly or by circumlocution, can contrast *me* and *you, here* and *there, inside* and *outside, now* and *then, today* and *tomorrow, mother* and *offspring, "father"* (in different senses), *friends* and *enemies,* and so on for untold thousands of ideas. By means of this immeasurably potent apparatus of articulate speech man collectively has transformed himself and created many worlds: such as codes of behavior, civilizations, philosophies, mythologies, religions, sciences, inventions, systems of education, the fine arts, the game of chess and thousands of others. But it is no wonder that to the man on the street the idea that man could develop out of any kind of speechless ape might seem merely funny. Not a few philosophers and mathematicians, with no real knowledge of the evidence that they themselves and their systems are by-products of the "procession of the vertebrates," have been inclined to set man on a lonely pedestal and to treat such a naively human personification as "mind" as if it were truly an objective individual entity instead of an artificial summation for billions of different psychosomatic responses by human and other sentient beings. ***William King Gregory, "Evolution Emerging," 1951, Vol. I, p. 538.***

Mandibular condyle migrations as influenced by tooth occlusions

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The main role of the healing arts is to maintain the normal body state or to improve the abnormal. As a rule, dentists have a fair degree of success in playing their part; but they must guard against improper treatment. It appears now that in one phase of complete denture construction, some dentists are actually inflicting certain injuries on their patients.

The most serious of these injuries are (1) destruction of the alveolar ridges, (2) deformation of the mandible and (3) injury to the temporomandibular joint. Injuries of the first two types are clearly visible to the unaided eye. They can also be palpated and be seen in roentgenograms. The third type has numerous manifestations which usually escape the dentist unless he makes the necessary effort to observe them. In this study the first two types are discussed only in their relation to the third. The third, injury to the temporomandibular joint, is the subject of this paper. At this time neither the high incidence nor the severity of joint involvement is considered, although suffering from this cause is more prevalent than generally recognized.[1,2]

Malrelated condyles may be the result of injury to the joint, trismus of the muscles, cuspal interference or improper placement of the occlusal load; but, whatever the cause, it is the duty of the dentist to assume his part in the treatment. Malrelations of the condyles vary widely in direction and extent. Some of them cause little or no damage; others cause troubles of a serious nature.

When patients confront the dentist with definite complaints due to malrelations of the condyles, usually he is able to give relief by current methods.[3] Unfortunately, the cures are not always complete or permanent. Worse yet, especially in the field of complete denture construction, dentists are continuing practices that bring on or intensify the troubles.

Somehow dentists have failed to realize how much artificial denture patients suffer from ear lesions and other joint troubles. Though comparatively few adequate case histories are available, routine questioning by a small number of interested dentists and otologists leads to the belief that there are millions of patients suffering unnecessarily[4] from malrelated

1. Harris, H. L. Effect of loss of vertical dimension on anatomic structures of the head and neck. J.A.D.A. & D. Cosmos 25:175 (Feb.) 1938.

2. Block, L. S. The temporomandibular syndrome as related to full denture prosthesis. J.A.D.A. 42:428 (April) 1951.

3. Block, Louis S., and Harris, Elam. Approach to a rational study and treatment of temporomandibular joint problems. J.A.D.A. 29:349 (March) 1942.

4. Schier, M. B. A. Facts and fallacies on temporomandibular articulation and jaw relationships as pertains to deafness. D. Items Interest 62:507 (June) 1940.

condyles. Dentists now have at hand[5,6,7] the means to relieve much of this suffering, or better still, to prevent it, for even though in most cases the symptoms can be relieved, some permanent damage may still remain.

PARTIAL CORRECTION

Among the dentists who have recognized temporomandibular lesions there has been an earnest effort toward correction. These men for the most part have tried to bring relief by "opening the bite" and "balancing the occlusion," usually more or less freeing the occlusion at the same time.

BITE OPENING

As for opening the bite, it is quite possible that the relief experienced in some cases was due to an unintended or incidental change in the occlusal scheme. The teeth may have been freed in eccentric articulations, or the load may have been placed farther back.[8,9,10,11]

It has been pointed out[12,13] and more or less generally accepted that opening the jaw relation and freeing the occlusion may be followed by a shift of the mandible. The opening may or may not have anything to do with the shift, but a necessary condition is the clearing of the occlusion. The writer has shown in many cases that opening the jaw relation is not necessary to cause a shift of the mandible. In these cases the only change was freeing the occlusion and grinding all the opposing tooth surfaces anterior to the first molars so that they would be well out of contact.

BALANCING OCCLUSION

The need for repeated balancing of occlusion should have alerted dentists to the fact that the relations found in the patient's mouth are not necessarily the ones to be used on the articulator. If there were no changes in the jaw relations, a set of dentures once balanced would need no subsequent occlusal adjustments.

Quite aside from the important fact that the mandible tends to move gradually farther forward, periodic tests show consistently that the need recurs for reducing the incisal and working occlusal surfaces to restore protrusive and lateral balance. Sometimes dentures balanced to a nicety will become unbalanced within a few days, requiring further occlusal reductions in the same places.

This difficulty can be reduced by mounting the dentures and increasing the steepness of the condyle paths beyond the patient's recorded angles before balancing the occlusion on the articulator. If this is done, there will be premature contact on the molars in protrusion and premature contact on the balancing side in lateral occlusion. As the dentures are worn, they will come into balance with the descent of the condyles, that is, if the estimated increase was correct.

Bite raising with clearing and balancing of occlusion is but a partial solution to the problem. Something more comprehensive is needed—a means of establishing the occlusal scheme so that merely

5. Greene, E. Temporomandibular joint: dental aspect. Ann. Otol., Rhin. & Laryng. 46:150 (March) 1937.

6. Costen, J. B. Correlation of X-ray findings in the mandibular joint with clinical signs, especially trismus. J.A.D.A. 26:405 (March) 1939.

7. Riesner, Sidney E. Temporomandibular reactions to occlusal anomalies. J.A.D.A. & D. Cosmos 25:1938 (Dec.) 1938.

8. Fisher, E. A. Migraine and the closed bite. J.A.D.A. 29:844 (May) 1942.

9. Kallenbach, T. E. Factors in correcting jaw position relative to the abnormal temporomandibular joint. D. Digest 47:66 (Feb.); 47:108 (March); 47:220 (May) 1941.

10. Block, L. S. Diagnosis and treatment of disturbances of the temporomandibular joint especially in relation to vertical dimension. J.A.D.A. 34:253 (Feb.) 1947.

11. Higley, L. B. Some controversies over the temporomandibular joint. J.A.D.A. 27:594 (April) 1940.

12. Edmand, Paul A. Restoring lost vertical dimension. J.A.D.A. & D. Cosmos 25:849 (June) 1938.

13. Leof, Milton. Revision of accepted dicta on mandibular position. New York J. Den. 20:8 (Jan.) 1950.

wearing the dentures will tend to correct any malrelations and to maintain the condyles in their correct relations. No longer should the occlusal adjustments be pronounced satisfactory on the basis of the conditions present at the time the dentures are delivered.

For many years dentists devised occlusion for artificial dentures on two assumptions that are now challenged. The first assumption that the recorded jaw relations were permanent led to the second that the recorded jaw relations were the ones according to which artificial dentures should be made.

Enough data have been accumulated to show that the patient's jaw relations can and many times should be changed by control of the occlusal loading. Likewise, in a large proportion of cases the articulator settings obtained from records made by the patient should be altered before the teeth are arranged. The directions, extent and means of making the alterations will be discussed presently.

LOCATION OF OCCLUSAL LOAD

The common cause for the three types of injuries previously mentioned is the tendency of the occlusal load to travel toward the anterior extreme. Figure 1, A, B and C shows how this occurs. Figure 1, A is a right side view of the temporomandibular articulation, the maxilla, the mandible and the occluding posterior teeth on upper and lower denture bases. When the alveolar ridges become resorbed and the degree of jaw separation is unchanged, an interocclusal gap develops as shown in Figure 1, B. If nature failed to make any compensations, an occlusion such as that shown in Figure 1, C would follow in which only the anterior end of the occlusal plane would be in contact. This would occur because the axis of closure is situated posterior to the teeth with the result that closure occurs more rapidly at the anterior part of the occlusal scheme than at parts closer to the condyle. Unless provision is made to prevent it, the occlusal load soon becomes heavier at the anterior extreme.

The farther anterior the stop, the greater is the proportion of upward push at the condyle.[14] The greatest push on the condyle occurs when the stop is at the incisors, the least when it is at the last molars. Ordinarily, dentures are built with the occlusal load already too far anteriorly. With the conventional way of arranging teeth, this load soon travels even farther anteriorly.

Of course, dentists seldom see the condition depicted in Figure 1, C since actually nature makes the three types of compensation indicated in Figure 1, D, E and F. Although all three may occur in varying degrees, for the sake of clarity, they are depicted as being independent. Resorption of the anterior alveolar ridge or ridges is a commonly noted result of wearing improperly occluded artificial dentures. The weaker of the two ridges in general shows the greater resorption. For purposes of illustration the resorption shown in Figure 1, D as compared with that in Figure 1, C has occurred only on the lower ridge. This unequal resorption has so reduced the anterior part of the anterior ridge that the posterior teeth come into contact.

Another kind of change brings the posterior teeth toward occlusion as shown in Figure 1, E. Some writers maintain that there is no such thing as "bending of the bone." Nevertheless, the more obtuse angle of the ramus with the body and the deeper notch at the lower border are seen to be rather consistently greater in patients whose occlusal load has long been carried in the anterior part of the mouth. In some instances, the bending of the condyle (not depicted in these

14. Robinson, Marsh. Temporomandibular joint: theory of reflex controlled nonlever action of the mandible. J.A.D.A. 33:1260 (Oct.) 1946.

drawings) accounts for part of the compensation.[15]

With the contact at the anterior end of the occlusal plane (Fig. 1, C), the pull of the muscles causes upward pressure by the condyle. If the anterior contact were at infinity, the entire power would be applied at the joint. Conversely, the farther back the contact toward the point of application of muscle pull, the less would be the upward pressure by the condyles. There would also be less bending of the mandible.

In the present state of dental knowledge, once the conditions illustrated in Figure 1, D and E become established, there is little hope of reversing them; however, dentists can prevent them.

It is the upward displacement of the condyle (Fig. 1, F) that is the main topic of this study. This upward displacement, the cause of much difficulty, fortunately is reversible. The explanation of reversal involves a new concept of occlusion. To understand this new concept, one must have clearly in mind the requirements of the dental articulator.

ARTICULATOR REQUIREMENTS

Not all investigators concede the necessity for individually adjustable articulators.[16] Those who recognize this need generally agree that the best articulator is the one that most exactly copies the jaw relations indicated by the patient's records. In both schools of thought the reproduction either of centric or of some recorded "functional" relation on the dental articulator has been assumed to be the relation according to which the teeth should be set in centric occlusion.[17,18] The writer proposes to show that in general the adjustments of the articulator for both centric and eccentric relations must be different from those indicated by the settings given on the patient's jaw relation records.

The dental articulator should have condyle elements adjustable vertically in centric relation. Figure 2 shows an articulator equipped for lengthening the condyle posts. The screws in the base are made so that each turn raises the post by 1 mm. In the illustration the articulator is set for a hypothetical case; the right post is in its usual position, and the left one has been raised 3 mm.

The upper cast or denture is mounted by means of the face-bow. Regardless of the location of the opening axis, the ends of the face-bow must be adjusted on the patient's head so that a straight line between these ends will pass through the centers of the condyles. The face-bow needs to be fixed at the right-to-left center of the patient's head. The lower cast or denture is mounted in centric relation with both condyle posts down in their wells. The posts are then elevated before arranging the teeth.

There are changes also that should be made in the eccentric relations before the teeth are arranged. As long ago as 1929[19] it was recommended that the steepness of the condyle paths of the articulator should be increased by 10 degrees so that there would be premature contact on all balancing surfaces. This recommendation was too conservative; in some cases it should be much more.

In the light of the new concept explained in the present study, the relation records made in the patient's mouth merely furnish the dentist with starting positions from which to calculate the desired relations. With the existing condyle

15. Wright, Walter Henry. Some observations of jaw relationship to be considered during full denture construction. Nat. D.A.J. 9:209 (March) 1922.

16. Craddock, F. W. Accuracy and practical value of records of condyle path inclination. J.A.D.A. 38:697 (June) 1949.

17. McCollum, B. B. Fundamentals involved in prescribing restorative remedies. D. Items Interest 61:522 (June); 61:641 (July); 61:724 (Aug.); 61:852 (Sept.); 61:942 (Oct.) 1939.

18. Stuart, C. E. Articulation of human teeth. D. Items Interest 61:1020 (Nov.); 61:1147 (Dec.) 1939; 62:8 (Jan.); 62:106 (Feb.) 1940.

19. Sears, Victor H. Full denture procedure. New York, Macmillan Co., 1929.

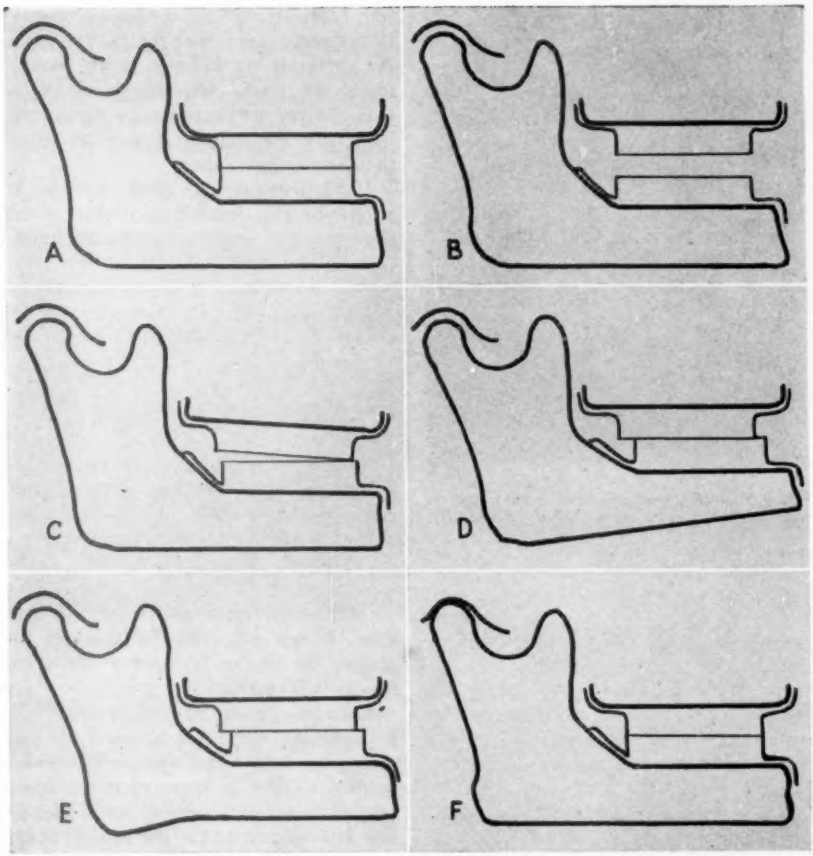

Fig. 1 • A: Right side of temporomandibular articulation, maxilla, mandible and occluding posterior teeth on upper and lower denture bases. B: Interocclusal gap with resorption of alveolar ridges. C: Occlusion with only anterior end of occlusal plane in contact. D: Posterior teeth in contact as a result of resorption of anterior part of anterior ridge. E: Posterior teeth in contact as a result of bending of the bone. F: Posterior teeth in contact as a result of upward displacement of condyle

indications as starting points, the dentist makes the alterations as indicated by all the known conditions. Factors governing the direction and extent of these alterations will be the subject of a future report.

From the foregoing it is clear that a dentist no longer can subscribe to the belief that the mouth itself is the ideal articulator or even a good one. He is not justified in accepting the jaw and condyle relations of the patient when the reproduction of these relations may be detrimental; it is his responsibility to determine the desirable relations.

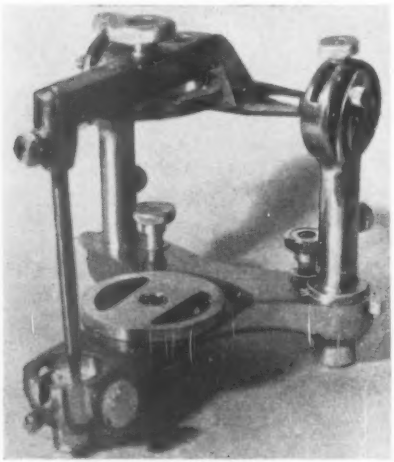

Fig. 2 • Articulator equipped with screws in base to provide for lengthening of condyle posts. Right post in usual position, left one raised 3 mm.

CENTRALIZING THE OCCLUSION

From the standpoint of stabilizing the denture bases, the occlusal load must be applied near the anteroposterior center of the weaker of the two denture foundations, usually the lower one.

Hanau[20] recommended what he termed a "rocking chair fit," a rounded occlusal scheme with the load at about the first molars. If this device is used, the load does not travel as far anteriorly with slight jaw closure in centric occlusion but instead is kept near the anteroposterior center. In Hanau's drawings no changes are shown in the temporomandibular joint. It is clear that he was not thinking of the effect on the joint because he gives as his two reasons for recommending the device: "It secures favorable pressure distribution in central occlusions under loads and it prevents interference of the masticatory surfaces. . . ." Fish[21] accepts a condition with "only the premolars and first molar in actual articulation." Brudevold[22] by the use of electric strain gages shows that the patient loads the dentures on different teeth according to the food being chewed. It seems that the patient instinctively places the load near the anteroposterior center of the denture foundation.

Until recently the chief interest in anteroposterior loading has been in the effect on the stability of the dentures. It becomes clear now that another important consideration is the decrease of upward pressure at the joint. This usually calls for a slightly different location for the loading.

MOLAR PIVOTS

It should be emphasized that with the muscle pull lying between the teeth and the condyles, there is no possibility of this force causing a downward pull on the condyle. The most a dentist can do is to decrease the upward push so that the diminished force will permit the condyle to descend. This he can do by placing the load as far back as the other factors will permit.

Since stability of the denture base must be provided, the exact location for applying the load is usually a compromise position. There is some variation from case to case, but for simplicity of discussion it is assumed that the load is to be carried by the first molars. When these teeth are the only ones in occlusion, they become pivots on which the mandible rotates. As the opposing incisors come closer together, the condyles descend.

With the pivoting at the first molars, the lower incisors are usually elevated about the same distance that the condyles are depressed. Thus the lower an-

20. Hanau, Rudolph L. The relation between mechanical and anatomical articulation. J.A.D.A. 10:776 (Aug.) 1923.

21. Fish, E. W. Principles of full denture prosthesis, ed. 4. London, Staples Press, 1948.

22. Brudevold, Finn. Basic study of the chewing forces of a denture wearer. J.A.D.A. 43:45 (July) 1951.

terior teeth move upward approximately the same distance that the condyles descend. Figures 3, 4 and 5 show cases in which the opposing incisors move closer. Figure 3 is a typical example of the distance the anterior teeth of new dentures come closer together in centric relation. First molar pivots were used. The change occurred in two days of wearing the dentures day and night. In the illustration the space between the upper left central incisor and marker is 1.5 mm.

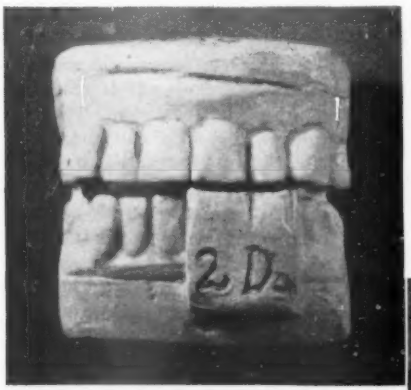

Fig. 3 • New dentures, first molar pivots used. Change occurred in two days of wearing dentures day and night. Space between upper left and central incisor and marker is 1.5 mm.

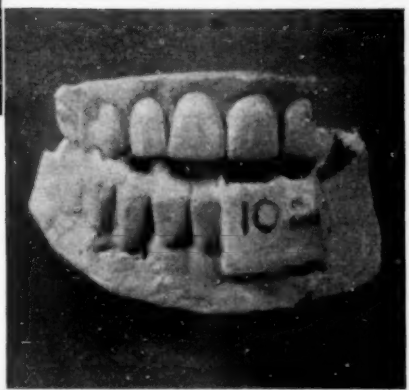

Fig. 4 • Lower first molars built up 5 mm. above bicuspids on old dentures. Exceptional amount of pivoting shown. In 10 days of wearing the dentures day and night the incisors came together 3.25 mm.

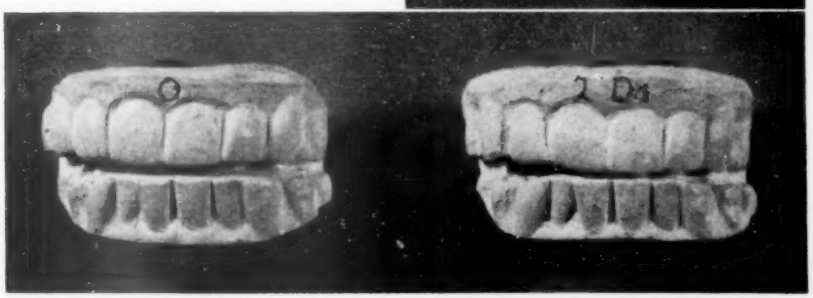

Fig. 5 • Lower first molars built up 2 mm. on old dentures. Left cast from face-piece made in protrusive relation at time of delivery of dentures, right cast of same two days later. Opposing incisors came together 1.5 mm.

In the second case (Fig. 4) the lower first molars were built up 5 mm. above the bicuspids on old dentures. There was an exceptional amount of pivoting. In 10 days of wearing the dentures day and night, the incisors came together 3.25 mm.

In the third case (Fig. 5) the lower first molars were built up 2 mm. on old dentures. The left cast from the facepiece was made in protrusive relation at the time of the delivery of the dentures; the right cast was made of the same dentures two days later. In this time the opposing incisors came together 1.5 mm. Protrusive wax records showed condyle indication increases of 15 degrees on the right side and 10 degrees on the left.

The changes of the tooth occlusions and condyle indications in protrusion are related to the changes in centric relation considered in this report. These relations will be given consideration at a future time.

Although this use of molar pivots is new in the artificial denture field, nature has long used the device with the first permanent molars. While the deciduous teeth are being lost, the first permanent molars maintain the jaw separation. During this period of loss and replacement of natural teeth the mandible can pivot on the first permanent molars and probably does so especially if the deciduous posterior teeth were lost prematurely. These natural molar pivots are located in almost exactly the same position where dentists usually should place the artificial molar pivots.

HEIGHT OF PIVOTS

In treating the individual case the question arises as to how high the molar pivots should lie above the other teeth. In each case this height must be estimated according to the conditions present. Cases of long standing temporomandibular joint troubles and those in which the patient has worn ordinary complete artificial dentures for several years usually require comparatively high pivots. At first high molar pivots cause a wide separation of the opposing incisors. One who for the first time observes the effect of high molar pivots in a patient's mouth is usually amazed at the extent to which opposing incisors come together again during the first few days.

Although in old dentures pivoting of the mandible can be produced merely by raising the first molars, the result is not entirely satisfactory. It is better to establish the occlusion according to the position of the jaw at the end of rotation on the molar pivots. For this purpose special provision was made on the articulator (Fig. 2) so that the condyle posts could be adjusted vertically. The condyle posts are raised the distance estimated as necessary to separate the posterior part of the articulator before the teeth are occluded. Thus molar pivots of any desired height are provided.

A consideration of Figure 6, A and B shows clearly how the teeth move gradually into the anticipated occlusion. When the condyle has been pushed up because of anterior contact (Fig 1, C), the dentist causes contact in the patient's mouth at the molar region only, leaving a space anterior to it (Fig. 6, A). This change decreases the upward pressure at the joint so that the condyle can descend. As the condyle descends, rotation occurs in a limited arc on the molar pivots and the pivoting of the mandible brings the teeth together in the anterior part of the mouth (Fig. 6, B). If the estimate of the descent of the condyle was correct and if the condyle posts of the articulator were raised accordingly, the occlusion becomes equal on all the posterior teeth (Fig. 6, B).

NONINTERFERENCE

The full benefit from the use of molar pivots is possible only when their occlusal surfaces are essentially horizontal.

Then there are no projections to hinder horizontal movement of the teeth and hence of the condyles. To achieve this effect the teeth should be cuspless.

A set of occluded dentures with so-called anatomic teeth as seen from the buccal side can be taken as an example. Any jaw closure beyond that to which the teeth were set puts pressure on the mesial cusp inclines of the lower teeth and causes a backward thrust on the lower denture. Here again nature makes certain adjustments to help overcome the condition. The greater adjustment is on the weaker of the two alveolar ridges, usually on the lower one.

Resorption of the denture-supporting tissues alone may be sufficient to keep the teeth in mesh; but when the teeth lock and the supporting tissues are not resorbed, the next adjustment by nature is a backward thrust of the condyle in its socket. Occasionally the closure is so rapid that these adjustments are not made to a sufficient degree and the whole occlusion "jumps a cog." Not only the molars but all the occluding teeth must be made noninterfering.

BILATERAL EQUILIBRIUM

The use of molar pivots as just described permits the mandible to find a position of rotational equilibrium as seen from the buccal side and also allows the horizontal migration of the condyles. There remains the problem of assuring equilibrium as seen from the front.

At times it is necessary for one condyle to descend more than the other one. In case the original estimate was not correct and the proper vertical adjustment was not made on the articulator, there are other ways of permitting the necessary unequal drop. One way is to construct bases so that the only point of contact lies in the right-to-left center of the mouth. A rigid metal bar is pivoted in the vault. This arrangement permits the right and left sides to pivot on the center point (Fig. 7), so that the closing force is distributed equally on right and left sides.

In practice it was found unnecessary to use bases of this kind. If the patient can be persuaded to leave out one of the dentures, nature brings about the equilibrium, for merely leaving out one or both dentures permits the condyles to descend. If the patient will not remove the dentures long enough to produce mandibular equilibrium, however, bilateral imbalance can be detected with thin carbon paper. When it is detected, the high area should be reduced beyond the condition of simultaneous right and left contact. The patient should be recalled for further testing.

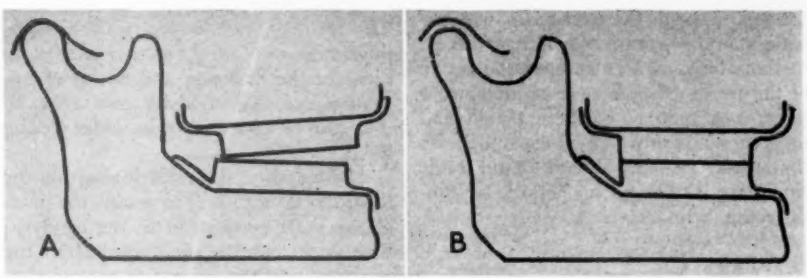

Fig. 6 • A: Only the first molars in occlusion, leaving a space anterior to them. B: Descent of condyle with occlusion of anterior part

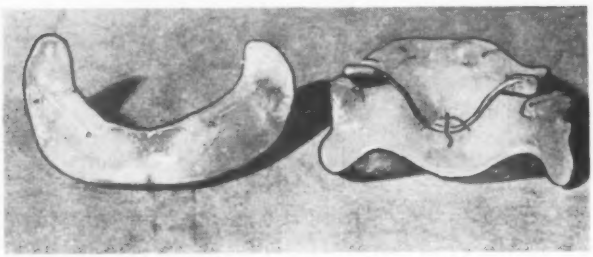

Fig. 7 • Bases constructed to apply all the load in right-to-left center of mouth. By rigid metal bar pivoted in vault closing force is distributed equally on right and left sides

At one time many dentists made a practice of depriving their patients of dentures for a few days or weeks before starting new construction. Some still follow this procedure in the belief that the old dentures distort the denture-supporting tissues and that the rest period permits these tissues to assume their undistorted forms. Perhaps the chief advantage lies in permitting the condyles to assume more nearly normal relations in their sockets.

MUSCLE SPASM

Some dentists believe that condyle malrelations are caused by muscle spasm and that relaxing the muscles brings the condyles to their normal relations. It is probable that, either as a cause or effect, there is associated with condyle malrelation a certain degree of tension. If so, relaxation by any means may help.

Some operators resort to hypnosis, vibration, massage, heat, exercises or medication to relieve tension; perhaps all these methods have merit. However, the device of the molar pivot here explained seems to act most quickly, most completely and most permanently. The writer believes that molar pivoting should be the basic treatment. Other means should be considered as adjuncts.

PROOFS

Proofs of changes in the joint are found in (1) relief of symptoms, (2) condyle roentgenograms, (3) decreased space between the opposing incisors and (4) the readings on a special device known as the condyle migration recorder. In connection with (3) and (4) it might be argued that these phenomena could be due to changes in the seating of the bases. Some change from this cause is to be expected, but ordinarily it is slight. To test the validity of this observation, the writer made a number of occlusal splints on natural teeth; the readings thus obtained were similar to those taken with artificial teeth on denture bases. It is possible also to check the readings of the condyle migration recorder against roentgenograms of the joints. Although this study deals principally with temporomandibular disturbances connected with artificial dentures, the implications for natural dentures are clear.

MIGRATION RECORDER

The special device known as the condyle migration recorder (Fig. 8) is used to measure the direction and extent of migrations of the condyles and may be used also to measure strain under closing force.

The length of the condyle shaft on the recorder is adjusted to make the ends of the shaft correspond to the condyles. The upper cast is transferred from the articulator to the migration recorder on a mounting ring to preserve the front-to-back relation of the upper cast to the

glenoid fossae. The condyle posts are then adjusted laterally so that the two vertical ruled plates are equidistant from the center of the articulator and in firm contact with the pointed ends of the condyle shaft at the intersections of the zero vertical and the zero horizontal lines. Finally the lower cast is mounted with plaster on the lower member of the recorder by means of a wax centric relation record.

With subsequent records made at centric relations, the migrations of the condyles can be read in the three dimensions of space. The subsequent positions of the ends of the shaft on the vertical ruled plates indicate the sagittal vertical and horizontal changes of condyle relations. The readings along the horizontal lateral channel of the lower member of the recorder indicate the side shift of the condyles.

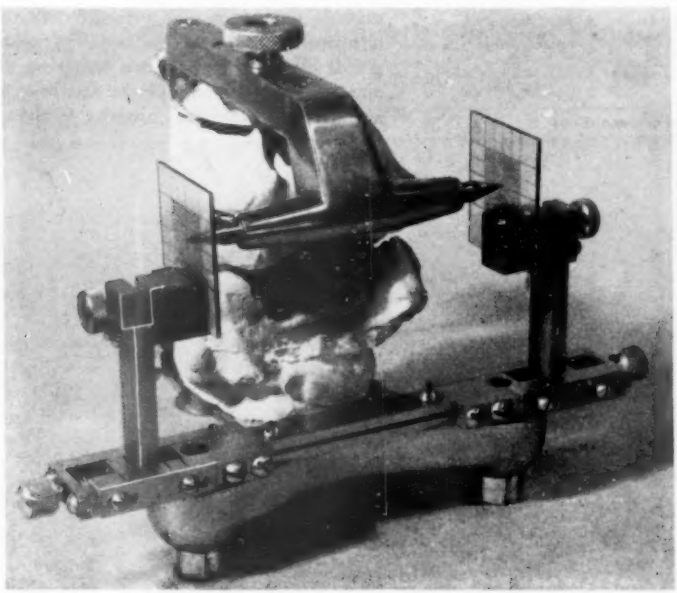

Fig. 8 • Condyle migration recorder. Length of condyle shaft adjusted so that ends correspond to condyles. Upper cast transferred from articulator to recorder on mounting ring so that front-to-back relation of upper cast to glenoid fossae is preserved. Condyle posts adjusted laterally so that vertical ruled plates are symmetrical at the distance which brings them into firm contact with pointed ends of condyle shaft at intersections of zero vertical and zero horizontal lines. Lower cast mounted with plaster on lower member of recorder by means of a wax centric relation record. Subsequent records are made at centric relations so that migrations of condyles are read in millimeters in three dimensions of space. Subsequent positions of ends of shaft on vertical ruled plates indicate sagittal vertical and horizontal changes of condyle relations. Readings along horizontal lateral channel of lower member of recorder indicate side shift of condyles

Table • Two cases of changes in condyle relations

A. Case with new complete upper and lower dentures*

Record	April 13	April 14	April 16
Articulator protrusive record			
Right	38	44	46
Left	32	42	46
Migrator record			
Centric			
Right vertical	0	3.5	4
Right horizontal	0	−3	−3
Left vertical	0	3	3
Left horizontal	0	5	5
Shift	0	4 to rt.	4.5 to rt.
Protrusive			
Right vertical	4	4	5
Right horizontal	3	3	2
Left vertical	3	5	4
Left horizontal	7	8	6
Shift	3 to rt.	5	6

B. Case with lower occlusal splint†

Record	April 5	April 13	May 26	June 25
Articulator protrusive record	—	—	—	—
Migrator record				
Centric				
Right vertical	0	1	1	
Right horizontal	0	1.25	2	
Left vertical	0	2	2	
Left horizontal	0	1.5	1.5	
Shift	0	2 to rt.	1.5	
Protrusive	—	—	—	—

*Articulator opened 4 mm. at pin. From 59 to 63. Migrator measurements in mm.

†Articulator opened 3 mm. at pin.

Thus, serial readings can be made also for both centric and eccentric relations. One of the unexpected discoveries in the use of this recorder was the extent of lateral shift of the condyles.

Data accumulated by use of the condyle migration recorder for a large number of cases will show the probable directions and extent of migrations for the individual case to be treated. Such data will enable the dentist to estimate better the normal, or at least the acceptable, condyle positions for the case at hand. By means of these estimates the dentist will be able to adjust the articulator and the occlusions intelligently. This study is concerned with changes occurring in centric relation; consideration of changes in the eccentric relations will be made the subject of a future paper.

PREVENTION

Once having placed the mandible, and with it the condyles, in equilibrium at centric jaw relation, the dentist should so establish the occlusion that malrelations will not develop again. Three of the possible means are (1) periodic occlusal adjustments by the dentist, (2) molar pivots elevated high above the occlusal plane and (3) molar pivots less readily abraded than the teeth anterior to them.

OCCLUSAL ADJUSTMENTS

Periodic occlusal adjustments by the dentist can do much to prevent or correct malrelations of the condyles; but they are open to two objections: (1) by the time it is discovered that there is interference or unbalance of the occlusion, already there is danger of some malrelation and (2) it is not practical to expect patients to return as often as necessary.

HIGH PIVOTS

The mere elevation of the first molar above the occlusal plane serves well as far as the condyle relation is concerned, but it restricts the total occlusal area. Usually the second bicuspid and sometimes the first bicuspid also can be used to advantage by the patient in chewing his food if these teeth are allowed to occlude. Although the high pivots alone are satisfactory from the standpoint of reducing the upward force at the joint, they are not entirely satisfactory from the standpoint of chewing. If the condyle posts of the articulator are given the

required elevation before the teeth are arranged so that in the patient's mouth only the molar teeth occlude, the descent of the condyles allows the bicuspids also to come into occlusion in centric jaw relation. Therefore, not only should the molar pivots be high enough but also the entire tooth arrangement should be such that it will gradually fall into the desired occlusion as the condyles come into equilibrium.

HARD PIVOTS

As it has already been pointed out, it is not enough to place the load on the molar pivots; some provision must be made to maintain it there. The ideal way to meet the problem of maintaining the load on the first molars without taking the bicuspids considerably out of occlusion is to use different tooth materials in the same set. The molars should be made of a material more resistant to wear than the teeth anterior to them.[23] Then the anterior teeth will wear down if the load tends to travel onto them, and this wear will maintain the force at the site of the less readily abraded molars. If the right degree of wear for the teeth anterior to the pivots can be assured, this device provides a means of

23. Sears, V. H. Principles and technics for complete denture construction. St. Louis, C. V. Mosby Co., 1949.

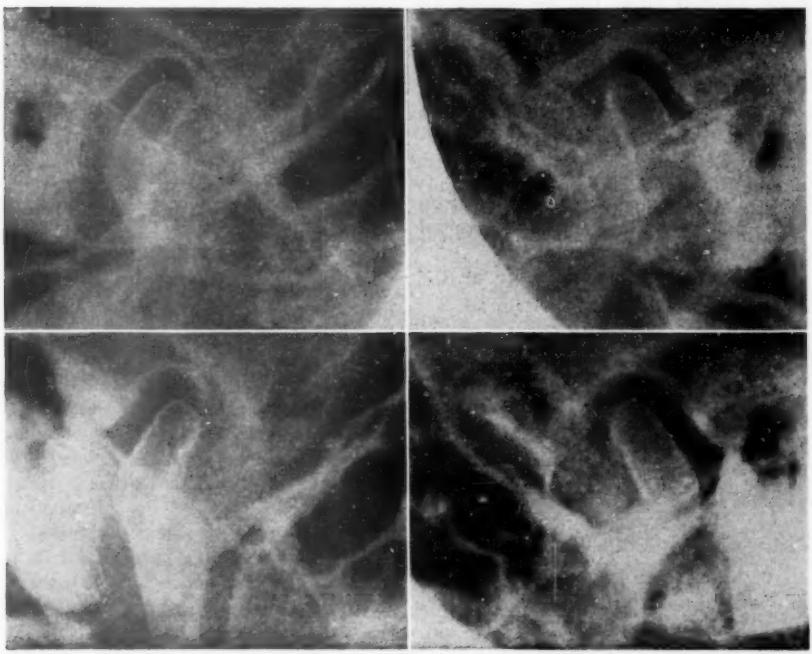

Fig. 9 • Roentgenograms corresponding to the migration recorder data given in Table, B. Upper roentgenograms made at time occlusal splint was placed; lower ones made after pivoting occurred show that the condyles have descended

keeping the occlusion adjusted automatically over long periods of time.

The concept of producing and maintaining the load near the posterior part of the occlusal scheme and at the same time freeing the condyles for migration in all three dimensions of space is more revolutionary than the concept of nonanatomic teeth on which this study is based. Although molar pivots can be used to permit vertical changes in the condyle relations where cusped teeth are used, only cuspless teeth can provide fully for maintaining vertical resultant force under vertical closure and for permitting free horizontal migrations of the condyles. All these are important considerations.

In their future work dentists should so establish the occlusions that they save their patients from the ills caused by artificial dentures as ordinarily made. The wear-resistant cuspless molar pivot is an important new device both in prevention and in cure.

CASE HISTORIES

A small sampling of case histories is given here to indicate something of the general pattern (Table, Fig. 9).

Except for the lateral shift of the condyles, Table, A gives a fairly typical picture of changes in condyle relations. The lateral shift of 4.5 mm., though not the greatest, is much greater than usually recorded. Lateral shifts of about 1 mm. are common. In this instance, ear symptoms long troubling the patient were relieved without any recurrence to date. Table, B shows more typical changes of condyle positions in centric jaw relation. In this case also ear symptoms of several years standing were relieved completely without any recurrence to date. Corroborating evidence of the migration recorder data given in Table, B is provided by the roentgenograms of the condyles (Fig. 9). The upper roentgenograms were made at the time the occlusal splint was placed; the lower ones, made after pivoting occurred, show that the condyles have descended. As yet roentgenograms have not proved entirely satisfactory for measuring condyle migrations. They do, however, agree in general with the readings on the condyle migration recorder.

Correlation of present and future findings will for a long time require the work of professionals interested in the healing arts; for there is still much to learn. This study opens up a profitable field for future investigation.

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An Enlightened Mind • One of the most essential Things necessary in the new-forming Men, is the reduction of the Passions to a proper Regimen, i.e., The Government of the sanctified Understanding. . . . The plain Truth is, an enlightened Mind, and not raised Affections, ought always to be the Guide of those who call themselves Men. *Charles Chauncy, "Seasonable Thoughts on the State of Religion in New England," 1743.*

The incidence of dental caries in habitual sugar cane chewers

Samuel Dreizen, D.D.S., Birmingham, Ala., and Tom D. Spies, M.D., Chicago

Although dental caries is a world-wide problem, there is no uniformity of opinion as to its causation. Much of the prevailing confusion stems from attempts to explain on a nutritional basis the differences in caries incidence among various population groups and among various members of the same population group. Typical of such explanations is the proposition that whereas refined carbohydrate foods may be conducive to tooth decay, the same foods if ingested in the raw or natural state are protective against this disease. The example most frequently cited is that of sugar cane. Claims have been made that if sugar cane is chewed in the raw state its high vitamin K content,[1] its high calcium and phosphorus content[2] or its detergent action[3] inhibits caries formation but that if administered in the refined state this same food is rapidly degraded to acid end products by oral microorganisms in concentrations sufficient to dissolve tooth structure.[4]

Laboratory and clinical studies having a direct bearing on this problem are marked by inconsistencies at each level. Although Osborn, Noriskin and Staz[5] noted that refined sugar, refined wheat flour and refined corn flour were more readily converted to acids *in vitro* than were the crude forms of the same carbohydrates, Volker and Pinkerton[6] reported that cane sugar in the raw state and in five different stages of refinement was fermented by acidogenic bacteria as rapidly as refined glucose or refined sucrose under the same experimental conditions. Clinically, Osborn and Noriskin[7] found a low incidence of caries among Bantu laborers in the sugar cane fields of South Africa, whereas Steggerda and Hill[8] observed that the white and negro sugar cane chewers on the island of Jamaica had an extremely high prevalence of dental caries. Because of these seemingly

Northwestern University studies in nutrition at the Hillman Hospital, Birmingham, Ala. From the department of nutrition and metabolism, Northwestern University, Chicago. This study was supported by grants from the Clayton Foundation for Research.

1. Fosdick, L. S.; Fancher, O. E., and Calandra, J. C. Effect of synthetic vitamin K on rate of acid formation in mouth. Science 96:45 (July 10) 1942.

2. Osborn, T. W. B.; Noriskin, J. N., and Staz, J. Inhibition in vitro of decalcification in teeth. J. D. Res. 16:545 (Dec.) 1937.

3. Neumann, H. H. Medical progress and dental decay. N. Y. State J. M. 51:1749 (July 15) 1951.

4. Jay, Philip. The role of sugar in the etiology of dental caries. J.A.D.A. 27:393 (March) 1940.

5. Osborn, T. W. B.; Noriskin, J. N., and Staz, J. A comparison of crude and refined sugar and cereals in their ability to produce in vitro decalcification of teeth. J. D. Res. 16:165 (June) 1937.

6. Volker, J. F., and Pinkerton, D. M. Acid production in saliva-carbohydrate mixtures. J. D. Res. 26:229 (June) 1947.

7. Osborn, T. W. B., and Noriskin, J. N. The relation between diet and caries in the South African Bantu. J. D. Res. 16:431 (Oct.) 1937.

8. Steggerda, M., and Hill, T. J. Incidence of dental caries among Maya and Navajo Indians. J. D. Res. 15: 233 (Sept.) 1936.

conflicting reports, the clarification of the role played by raw sugar cane and crude carbohydrates in the production and prevention of dental caries seemed to be in order. To resolve this problem, the incidence of dental decay was investigated in an isolated group of subjects whose daily diet since birth was high in content of raw sugar cane and of natural and unrefined carbohydrate foods.

MATERIALS AND METHODS

This investigation was conducted in west central Cuba. The site chosen was the center of a vast area devoted almost exclusively to the cultivation of sugar cane. The group of subjects consisted of 147 persons selected consecutively. Each was indigenous to this region and each chewed raw sugar cane daily. The group comprised 84 males ranging in age from 3 to 81 years and 63 females ranging in age from 3 to 76 years. One hundred and twenty-five of the 147 persons examined were under 40 years of age. The age and dentition distribution is shown in Figure 1. One hundred and forty-one subjects were white; 6 were negro. All the white subjects were of Spanish extraction.

The oral examinations were made in the homes with the aid of a mouth mirror, exploring tine, chip-blower and mouth lamp. Artificial light served as the source of illumination. Transillumination was used to detect grossly incipient interproximal decay. Only those dental lesions which contained both the discoloration and the decalcification characteristic of dental decay were included in the final tabulation.

Each family group was interrogated as to its food preferences, method of food preparation and diet habits. The nutritional status of each subject was established clinically by an examination of the lips, gingivae, oral mucosa, tongue, eyes, conjunctivae, skin, hair and extremities. These examinations were performed by an investigator trained in the recognition of evidence suggestive of nutritive failure.

DIETARY OBSERVATIONS

The diet of the study group contained a preponderance of crude and natural carbohydrate foods consisting of raw sugar cane, raw sugar cane juice, crude brown sugar, starchy tropical and semitropical fruits and vegetables, coarse home ground maize meal and partially refined rice. Raw sugar cane and raw sugar cane juice (*guarapo*) were consumed in extremely large quantities particularly during the harvest season. The harvest season extends from January to May. The cane, when ripe and ready for cutting, contains as much as 14 per cent sucrose by weight. When the raw cane is chewed, the stalks are stripped of their outer fibrous coating and cut into sections approximately 10 inches in length. The sections are munched until most or all of the juice is expressed, the fibrous residue is expectorated and the procedure is repeated until a point of satiation is reached. Raw sugar cane juice was a daily component of the lunches and between meal snacks of the children in each family. Crude brown sugar was used almost exclusively for seasoning and cooking. The fruits and vegetables most commonly used were *garbanzos,* or chick peas; chayotes, starchy tubers; mangos, a fruit rich in sucrose; yams, starchy tubers; *guayaba* (guava), a musty fruit rich in sucrose; coarse plantains which are starchy when green and saccharine when fully ripe; frijoles, or dried beans; *quimbombó* (okra), a mucilaginous fruit; and avocados, a fruit with a high protein content.

The chief sources of animal protein were small amounts of dried codfish and jerked beef. Milk, milk products and eggs were eaten only on rare occasions. Although there was no scarcity of chick-

ens, eggs were used primarily for barter purposes.

DENTAL OBSERVATIONS

Of the 147 persons examined, 10 were edentulous and 137 had a complete or a partial natural dentition. The edentulous group, comprising 5 males and 5 females, ranged in age from 36 to 76 years. In each instance, rampant dental caries was given as the chief cause for extraction.

One hundred and thirty-six of the 137 subjects with a complete or a partial natural dentition showed clinical evidence of past or present dental caries. The prevalence and incidence of dental decay in this group are shown in Table 1 and in Figure 2. The mean of the DMF tooth surfaces was 48.5, of which 21.6 were decayed, 25.3 were missing and 1.6 were filled. The average number of DMF teeth was 15.1, of which 9.6, 5.1, and 0.4 were decayed, missing and filled respectively.

The total number of teeth in the group with a complete or a partial natural dentition was 3,942, of which 2,065 or 52.4 per cent were or had been decayed. The 3,942 teeth included 333 deciduous teeth, of which 211 or 63.4 per cent showed evidence of dental caries, and 3,609 permanent teeth, of which 1,844 or 51.4 per cent had some manifestations of dental decay. The deciduous teeth were distributed among 32 children. The distribution of the carious teeth in each sex is shown in Table 2. It will be noted that 51.8 per cent or 1,181 of the 2,298 teeth in 79 males and 53.1 per cent or 884 of the 1,644 teeth in 58 females had a history or evidence of dental caries.

An indication of the amount of tooth structure destroyed by caries in the group is shown in Table 3. In 24.5 per cent of the carious teeth, all five surfaces were involved. In 323 of these teeth, only the roots remained in the mouth. In an additional 24.3 per cent of the carious teeth,

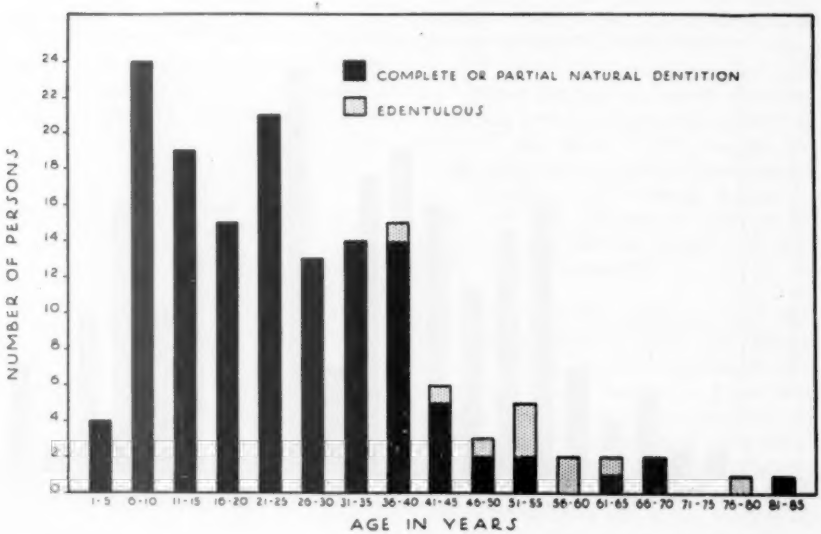

Fig. 1 • Age and dentition distribution of 147 Cuban subjects

Table 1 • Incidence of dental caries in 137* Cuban subjects with a complete or a partial natural dentition

Caries manifestation	Caries incidence			
	Total no. tooth surfaces	Average no. tooth surfaces per subject	Total no. teeth	Average no. teeth per subject
Decayed	3,057	21.6	1,323	9.6
Missing	3,480	25.3	694	5.1
Filled	214	1.6	48	0.4
Total	6,751	48.5	2,065	15.1

*One subject was completely free from any evidence of dental caries.

two or more adjacent tooth surfaces were affected. Table 3 shows the distribution of the type of decay in the teeth affected by dental caries, exclusive of those which were decayed completely down to the gum line. Of a total of 1,442 unrestored carious tooth surfaces, 800 originally contained pits and fissures and 642 were of the smooth surface variety.

The distribution, based on tooth morphology, of the carious deciduous teeth in 32 children is shown in Figure 3. The incidence ranged from none for the lower central incisors and lower right lateral incisor to 91.3 per cent for the lower right deciduous molar. The caries prevalence among the molar teeth ranged from 52.4 per cent (upper right first molar) to 91.3 per cent (lower right second molar). Figure 4 depicts the distribution, based on tooth morphology, of the carious permanent teeth in 131 subjects. The incidence of decay ranged from 15.4 per cent for the lower left central incisor to 92.3 per cent for the lower right second molar. Caries prevalence among the retained permanent molar teeth extended from 68 per cent for the upper right first molar to 92.3 per cent for the lower right second molar.

The distribution of the per cent of teeth attacked by dental caries in the group with a complete or a partial natural dentition is presented in Figure 5. The values are based on the age to the nearest year of the subject at the time of exami-

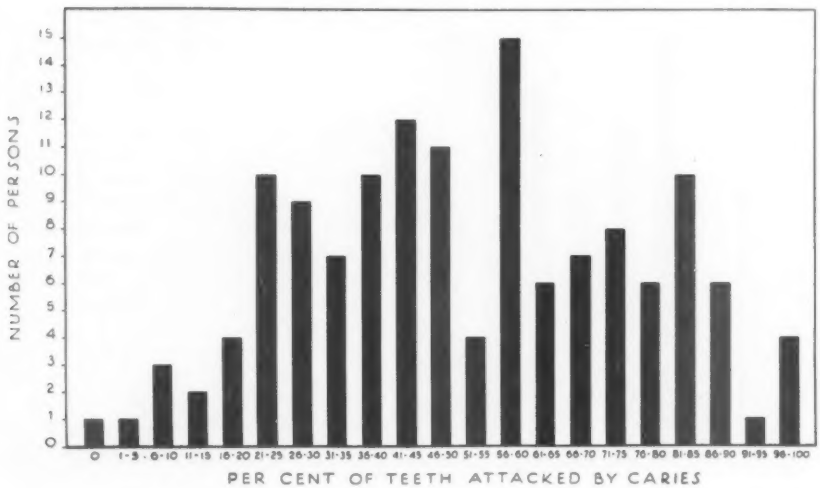

Fig. 2 • Distribution, based on age of subject, of per cent of teeth attacked by caries in 137 Cuban subjects with a complete or partial natural dentition

nation. It will be observed that only one person in this group was completely free from dental caries. The incidence of dental caries was lowest in children 10 years of age, an age at which many of the deciduous teeth are being replaced by their permanent successors. With the exception of the 10 and the 44 year old age groups, the average number of teeth showing carious involvement exceeded 32 per cent of each dentition at each age level.

OBSERVATIONS PERTAINING TO NUTRITIONAL STATUS

Gingivae • Gingivitis was observed in 28 subjects (19 males and 9 females), 22 (14 males and 8 females) of whom had concurrent chronic periodontal disease. Clinically apparent periodontal disease was not observed in any person under 29 years of age. Six cases of gingivitis were encountered in children in whom the dentition was in a state of transition from the deciduous to the permanent type. There was no clinical evidence of scorbutic gingivitis in any of the subjects examined.

Lips • Active bilateral angular cheilosis was noted in 5 children (3 males and 2 females). Scars as residual indicators of angular cheilosis were observed in 14 additional subjects (10 males and 4 females), all but 2 of whom were children. Five of the 19 persons with active or residual cheilosis had also either the ocular or the lingual changes, or both, associated with ariboflavinosis. In the remaining 14 cases the nature of the lesions and the clinical history were suggestive of perlèche.

Tongue • Glossitis involving either a hypertrophy or atrophy of the lingual papillae accompanied by edema and changes in color was observed in 7 subjects (5 males and 2 females). In 3 of the subjects the glossitis was of the type frequently associated with ariboflavinosis, while in the other 2 the changes in topography, size and color of the tongue were suggestive of a blood dyscrasia. There was no evidence of pellagrous glossitis or the glossitis of sprue in any of the persons examined.

Oral Mucosa • The capillaries appeared to be injected in 8 subjects. The palatal mucosa was involved in 3 persons in this group, the buccal mucosa in 1 and the mucosa of the floor of the mouth in 4. Each instance of injection of the palatal mucosa was accompanied by an injection of the palatine tonsils. The injection of the buccal mucosa and of the mucosa of the floor of the mouth encountered in 5 subjects was diffuse in nature and did

Table 2 • Distribution of DMF deciduous and permanent teeth in 137* Cuban subjects with a complete or a partial natural dentition

Subjects	Total number of teeth	Carious teeth	
		No. of carious teeth	Per cent of carious teeth
Males:			
Deciduous	160	87	54.4
Permanent	2,138	1,094	51.2
Total	2,298	1,181	51.8
Females:			
Deciduous	173	124	71.7
Permanent	1,471	760	51.6
Total	1,644	884	53.1
Total	3,942	2,065	52.4

*One subject was completely free from any evidence of dental caries.

Table 3 • Distribution of unrestored carious tooth surfaces in 137 Cuban subjects*†

Anterior teeth			Posterior teeth		
Surface	Upper	Lower	Surface	Upper	Lower
Incisal	9	5	Occlusal	391	331
Mesial	103	31	Mesial	71	73
Distal	76	46	Distal	91	77
Labial	29	14	Buccal	11	28
Lingual	5	1	Lingual	21	13
			Gingival	3	13

*One subject was completely free from dental caries.
†Does not include 323 teeth of which only the roots remained in the mouth.

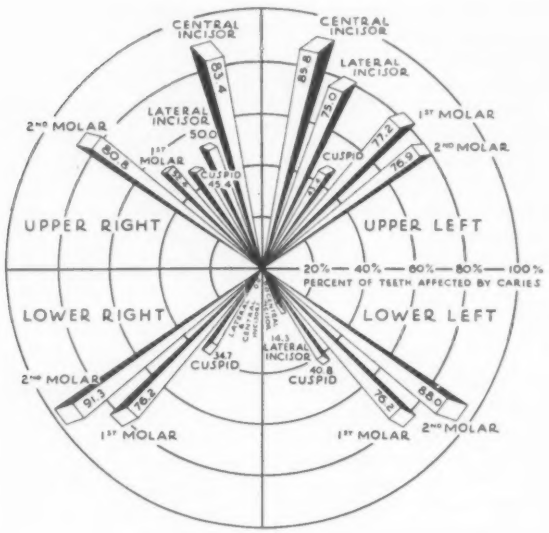

Fig. 3 • Distribution, based on tooth morphology, of DMF *deciduous teeth in 32 Cuban children*

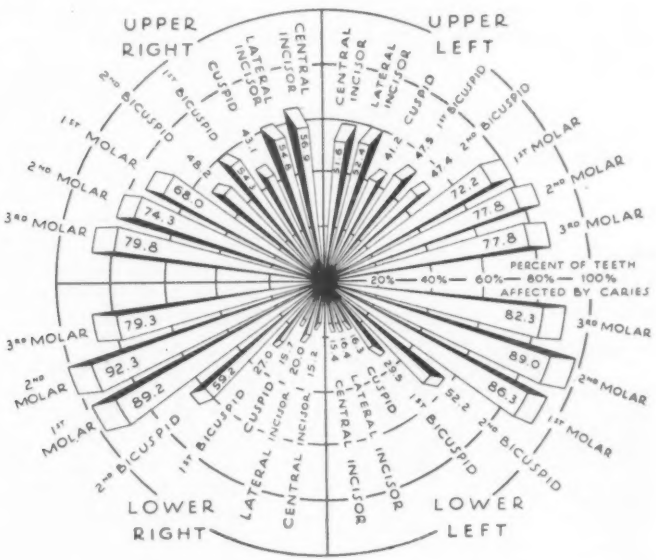

Fig. 4 • Distribution, based on tooth morphology, of DMF *permanent teeth in 131 Cuban subjects*

not appear to be of the type usually associated with the stomatitis characteristic of the various nutritional deficiency diseases.

Skin • There was no clinical evidence of the dermatitis or skin changes characteristic of pellagra or of a deficiency of vitamins A and C in any of the persons examined.

Extremities • None of the subjects had any indication of the peripheral neuritis usually associated with a deficiency of thiamine.

Eyes • There was no clinical evidence of the ocular changes accompanying a deficiency of vitamin A in any of the persons examined. Ocular changes involving photophobia and injection of the sclerae and conjunctivae of the type associated with ariboflavinosis were observed in 3 subjects.

Bone • There was no gross clinical evidence of rickets in any of the persons examined.

DISCUSSION

The extremely high incidence of dental caries encountered in habitual consumers of unrefined carbohydrates is not consistent with the concept that an antifermentation or otherwise protective factor exists in such foodstuffs in the quantity or form required to prevent dental decay. The extensive amount of tooth destruction accompanying the widespread caries prevalence suggests instead that the ingestion of the natural or crude carbohydrates together with the vitamins which constitute a part of the coenzyme complexes required for glycolysis aided and abetted the caries process. The recent report by Honig[9] of the vitamin B content of raw sugar cane juice lends support to this hypothesis. One glass, or 250 cc., of raw sugar cane juice was found to contain 800 to 1,000 micrograms of vitamin B_1, 600 to 800 micrograms of riboflavin, 200 micrograms of nicotinic acid, 4,000 micrograms of pantothenic acid, 0.5 micrograms of folic acid, 60 to 80 micrograms of pyridoxine and 25 micrograms of biotin. These quantities are more than ample to support the optimum growth of the oral *Lactobacillus acidophilus* and for the bacterial degradation of glucose to acid end products.[10,11] The presence of the relatively large amounts of the B group of vitamins in raw sugar cane juice is in accord with the almost complete absence of clinical evidence of vitamin B complex deficiency diseases in these subjects despite the low content of meat, milk and eggs in their daily diet.

The extent to which the high vitamin B complex content of the raw sugar cane juice may have been associated with the high dental caries incidence in this group of subjects is demonstrated by a comparison of the mean of their DMF teeth with that of Italians consuming a diet predominantly carbohydrate in character but deficient in the B vitamins. As reported by Schour and Massler,[12] the dental caries experience in Italy ranged from a mean of 1.05 DMF teeth of subjects between 11 and 15 years of age to a mean of 10.80 DMF teeth of subjects between 51 and 60 years of age. These values were from 94 per cent to 35 per cent lower than those found in the Cuban sugar cane chewers.

SUMMARY AND CONCLUSIONS

1. The dental caries incidence of 147 habitual sugar cane chewers on a lifelong

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11. Dreizen, Samuel; Greene, H. I., and Spies, T. D. Utilization of cereals in various stages of refinement by an oral strain of Lactobacillus acidophilus. J. D. Res. 29:307 (June) 1950.

12. Schour, Isaac, and Massler, Maury. Dental caries experience in postwar Italy (1945). I. Prevalence in various age groups. J.A.D.A. 35:1 (July 1) 1947.

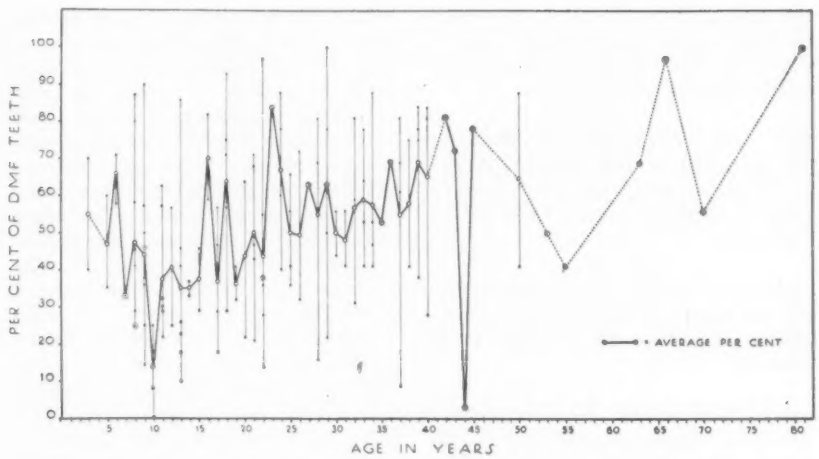

Fig. 5 • Distribution, based on age of subject, of per cent of DMF *teeth in 137 Cuban subjects*

diet composed chiefly of unrefined carbohydrates has been determined. The study group consisted of Cuban families all of whom were engaged in the cultivation of sugar cane.

2. Ten of the 147 persons were edentulous and 137 had a complete or a partial natural dentition. The dental caries incidence in the latter part of the group averaged 48.5 DMF tooth surfaces and 15.1 DMF teeth per person. Only one subject was completely free from dental caries.

3. The high caries incidence and extensive amount of tooth destruction observed in this group is not consistent with the hypothesis that raw sugar cane and unrefined carbohydrates contain a protective factor in amounts sufficient to prevent tooth decay.

Liberty • The shepherd drives the wolf from the sheep's throat, for which the sheep thanks the shepherd as his liberator, while the wolf denounces him for the same act as the destroyer of liberty, especially as the sheep was a black one. Plainly, the sheep and the wolf are not agreed upon a definition of the word "liberty"; and precisely the same difference prevails today among us human creatures, all professing to love liberty. *Abraham Lincoln.*

Detroit postpayment plan

Ralph H. Campbell, D.D.S., Detroit

From a public health viewpoint the primary purpose of dental postpayment plans is to bring dentistry within the economic range of more people. A postpayment plan which accomplishes this will benefit the public, the dentist using the plan and the dental profession as a whole.

The chief benefits to be derived from the use of postpayment plans are: (1) They will serve to simplify the nature of professional services rendered the public. (2) They will serve to reduce the actual cost of professional services to the patient. (3) They will serve to improve the relations between the public and the profession. (4) They will serve to increase the actual net profit to the dentist for rendering professional services.

To those not familiar with the broader application of dental postpayment plans, it might be difficult to understand how these benefits can be derived from the use of such plans. Therefore, for purposes of clarification, each of these individual points will be discussed.

1. Postpayment plans will serve to simplify the nature of the professional services rendered the public by allowing the work to be done at an earlier stage, since the chief reason for postponing dentistry is the inability of the patient to pay for a complete program of dental care on a cash basis.

2. Postpayment plans will serve in reducing the cost of dental services to the patient in two ways. First, dentistry postponed because the patient has no convenient means of paying for it may result in the loss of teeth, and often in serious injury to the patient's general health. Second, a more tangible cost to the patient is incurred when necessary work is delayed, greatly complicating the nature of the restorative problem. This results in a direct increase in the amount of the dentist's time necessary to place the patient's teeth in good condition and a corresponding increase in the fee.

3. Postpayment plans are an aid in eliminating the most frequent criticism that dentistry is too expensive. Among those who most frequently voice this criticism are the people, who, while they say they cannot afford the necessary health dentistry, at the same time are purchasing an automobile or a television set. The reason these people do not voice the same criticism about automobiles, television sets, refrigerators, and so forth, is that they have an opportunity to purchase these items on a convenient weekly or monthly payment basis. By the same token, if organized dentistry were to offer the public some convenient means of paying for necessary dentistry, the criticism that dentistry is too expensive would likewise largely vanish. This in turn would greatly improve the

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relationship between the public and the profession, thereby reducing the chances of any unfavorable form of socialized dentistry.

4. Dental postpayment plans will aid in increasing the dentist's net profit by, first, increasing the demand for his services and, second, by allowing him to schedule his operating time on the basis of production rather than on the basis of payment.

If dental postpayment plans will help accomplish these worthwhile objectives then it would seem to be an obligation of both the profession and the individual dentist to promote the use of such plans. If the profession is to embark on any program advocating the use of postpayment plans, however, then it becomes important that the plan operate on principles which have been found to be sound from a professional as well as from a business standpoint.

The Council on Dental Health of the American Dental Association has adopted a dental postpayment plan based on these principles and has recommended the adoption of this plan by local dental components. The plan itself was arrived at after a thorough investigation of those finance plans being used by dental societies in various parts of the country at the present time, as well as those which have been used by dental societies in the past, and which for one reason or another have failed to serve their purpose and have, therefore, been rejected by the majority of the dental profession as unworkable.

In the foreword to the "Dental Post-Payment Plan," the Council on Dental Health said, "It is felt that the Detroit Dental Society Payment Plan . . . embodies the most desirable features of all the plans which were studied, and that its success is due largely to the soundness of the basic principles under which it operates."

In order to show more readily how these principles may be formulated into a practical plan the principle will be stated and then it will be shown how this principle has been incorporated into the Detroit District Dental Society Payment Plan.

SOCIETY CONTROL

Principle • If the dental profession is to be sure that these finance plans are to be offered to the public in a manner which will do credit to dentistry, then the dental societies must retain strict control over them and the manner in which they are presented to the public.

Detroit Plan • The control of the Detroit Dental Society Payment Plan is vested in a commission of six men, elected by the Council, the governing body of the Society. These men, who must be chosen from those eligible to use the Plan, have staggered terms of office, two men being chosen each year. This commission is responsible for such things as, (1) selecting and controlling of the bank which enters into loans of this character; (2) formulating the rules by which members are permitted to participate in the Plan; (3) controlling the type of educational material used for presentation of the Plan to the public; (4) serving as an intermediary on any matters pertaining to the relationship between the bank and the Society, or the bank and the individual dentist; (5) prohibiting the use of the Plan by any member of the Society when circumstances warrant such action.

EDUCATION OF PARTICIPATING MEMBERS

Principle • Because of the fundamental lack of training in the business side of dentistry it would be necessary, if this plan were to succeed, for the dentist first to be given instructions in the background and use of the Plan.

Detroit Plan • To use the Detroit Dental Society Payment Plan a dentist must

be a member in good standing of the Detroit District Dental Society, and must also have taken a course of instruction in the fundamentals of the Plan.

At the present time the course of instruction consists of an evening's discussion of (1) some of the underlying principles in the use of a dental finance plan, (2) the details of the Plan itself, such as the credit application form, note form, disbursement of money, collections, service charges, and so forth; (3) the presentation and use of the Plan in the individual office and how the Plan can help bring dentistry within the economic range of more people. The details of the course are handled by the members of the bank who have the responsibility for the bank's part in the Plan.

Regarding the principle of education, the Council on Dental Health said, "It is the Committee's thought that the principle of educating participating members in the details of the plan is primarily responsible for the continued use and success of the Detroit Dental Society's Payment Plan."

PARTICIPATING BANK

Principle • The majority of patients respect the entrance of a third party into the transaction, and especially so if the third party is an established commercial bank serving the community in which the patient resides.

Detroit Plan • The Detroit District Dental Society uses the Detroit Bank, an established commercial bank with a personal loan department, which has been serving Detroit continuously for more than a 100 years. The cooperation from the bank has been excellent since the bank believes it is being of service to the community in a program of this nature.

The commission has authorized only this one bank to participate in the Plan since the volume of business is not large enough to warrant a division which would complicate the control of the Plan. The selection of a bank with a personal loan department is important as it allows the bank to handle the business without increasing its overhead and at a minimal cost to the patient and the dentist.

ELIMINATION OF RECOURSE

Principle • Dentists will not widely advocate any plan of financing in which the feature of recourse is retained.

Detroit Plan • The Detroit Plan eliminates the objectionable feature of recourse to the dentist. In order to compensate for this departure from regular loan contracts, a loss reserve fund to insure the loan is established from the principle. The dentist obtains 96 per cent of the money and the remaining 4 per cent is placed in a loss-reserve fund in the name of the Detroit District Dental Society. The dentist has no further recourse on the 96 per cent he obtains, nor does he individually have any control over the loss-reserve fund. All losses are charged against this fund and any earned reserves are credited to the Society annually. The commission believes that eventually a 2 per cent general loss-reserve fund should be sufficient to take care of any losses. It is the recommendation of the commission, however, that any society setting up such a plan should begin with a 5 per cent reserve figure and reduce it after experience warrants it justifiable.

NO CO-SIGNER NEEDED

Principle • It should not be necessary for the patient to have a co-signer on his note.

Detroit Plan • A co-signer is not allowed on the Detroit Plan, and neither is the dentist permitted to serve in this capacity. It was found that the objection many

people had to asking their friends or relatives to serve as a co-signer was one of the major weaknesses of many plans which had been tried in other localities.

LOW DISCOUNT RATE

Principle • Dentists will not readily accept any plan which requires a considerable discount on the amount to be financed in order to obtain cash on the balance.

Detroit Plan • A low rate of discount on the note has been accomplished under this plan through the use of the loss-reserve fund. The members using the plan appreciate the fact that in any plan of this nature there is bound to be some loss, and that the 4 per cent placed in the loss-reserve fund represents a small amount to be charged for the privilege of securing cash on the balance. The members further appreciate the fact that they will benefit indirectly from any accumulated reserves which are credited to the Society.

EXTENSION OF CREDIT

Principle • Banks and finance companies have proved that if reasonable credit is extended an individual, preceded by a thorough investigation, the average percentage of collection is between 98 and 99 per cent.

Detroit Plan • Before the granting of credit, this Plan includes a credit investigation by the bank's trained staff, who have a thorough understanding of the problem of credit, so that everyone who deserves credit will receive proper consideration. While it is the intention of the Society to be liberal in its attitude toward those receiving credit under this Plan, there is, however, no desire to extend credit to those people who have shown by their past record that their credit record is undesirable. Experience has shown that dentists as an average are not good at deciding who is or who is not a good credit risk. This is best left to those who understand the problem of credit.

COMPLETION OF THE TRANSACTION

Principle • It should be possible to complete the transaction in the dentist's office at the time the agreement is reached on the fees for services to be rendered.

Detroit Plan • It is possible under this Plan to complete all necessary transactions in the dentist's office. This eliminates the necessity of the patient going to the bank, and keeps the relationship on a more personal basis. Although the Detroit Bank has more than 30 branches in the city, completion of the transaction at the bank is not believed too important in the operation of the Plan, as it is possible to do all the necessary business by mail.

CONCLUSION

The Detroit District Dental Society believes that it has managed to incorporate the basic principles which the Council on Dental Health considers so important into a practical workable plan which has been available to its members for more than 10 years, and highly recommends that sister societies in every part of the country avail themselves of this fine opportunity to help bring dentistry with all of its health benefits within the economic range of more people.

4741 Spokane Avenue

Dental education, hold that line!

W. A. Wilson, D.D.S., Trenton, N. J.

Something has happened in the field of dental education—a new line of progress has been reached. Perhaps this advance was achieved by evolution through careful, long-term planning; the secretary of a State Dental Board, who for the past 15 years has watched the processions of dental school graduates, finds other reasons.

The graduates recently examined by the Board displayed an average degree of general proficiency far higher than that of any similar group ever to appear for examination. So striking was this demonstration of the completeness of their professional training that it appears worthwhile to analyze its underlying causes so that dental education may profit by any lessons to be learned.

It is granted that a State Board examination may not always be a correct method of evaluating accurately a candidate's qualifications. The tests of these candidates, however, showed such uniform results that they were considered convincing proof of a definite and almost abrupt improvement in dental education.

The New Jersey examinations of June 1951, from the standpoint of content and of grading standards, were equally as difficult as several past examinations; yet far fewer candidates failed than on previous occasions. Not only was there an improvement in the clinical and written tests; but examiners recorded a high degree of excellence in attitude, conduct, neatness of personal appearance and in professional characteristics. Since the candidates appeared by number only, their identity was not known by the examiners until the tests were graded. The results for individual candidates showed striking uniformity; in almost all instances, the eight examiners, working separately, arrived at approximately the same grades. The examinations tested practical as well as theoretical knowledge.

For the examination covering the field of prosthetic dentistry, the candidate constructed a full upper denture; he took the impression, registered the bite, determined centric and the vertical dimension and made the try-in.

In the examination covering the field of operative dentistry, the candidate prepared and inserted a Class I or V gold foil filling and also a compound amalgam filling.

For the examination on oral diagnosis and treatment planning, each candidate received a set of articulated models of an actual case, full series of roentgenograms of the case and the case history. In a booklet designed to record all findings the candidate was required to diagnose each of 32 teeth, to prescribe any needed treatment, to design proper restorations, to report the findings in a letter

Secretary, New Jersey State Board of Registration and Examination in Dentistry.

to the physician who referred the case and to diagnose 10 black and white and five Kodachrome slides showing various pathologic conditions.

The written tests, consisting of 100 questions divided into 10 groups, were slanted toward the dental application of the candidate's knowledge and covered all the important basic science and dental subjects taught in approved dental schools. Though it required a good background both in dental subjects and in basic science as applied to dentistry to answer 70 per cent of the questions correctly, few failures were recorded in the written subjects.

As already stated, this type of examination has been given a number of times before with results in respect to the breadth and completeness of dental education that were not impressive. In fact, the question often arose whether the graduates were any better prepared to practice dentistry than those of the days when there was no predental training and only the requirement of four or even three years of dental school as, for instance, during the "teen" years.

What is it that has happened now? Either it was just an accident that the 1951 graduates were unusually well trained or, if the facts stated above mean anything, dental education has found some of the answers to the problem of producing a more thoroughly trained dental graduate. Perhaps certain circumstances existing at the present have made it possible for dental schools to come nearer the accomplishment of their aims than evolution over a period of many years under ordinary conditions would have made possible.

An outsider, deeply interested in the field of dental education, ventures an opinion as to the factors which have brought about this remarkable improvement in dental education. Without detracting from the accomplishments or the fine caliber of the dentists of the past—they compared well with the men in any other profession—one may state with pride that in the face of great obstacles in the field of dental education dentistry has achieved almost a miracle.

First of all the factors responsible for the change was the ability of the dental schools to choose their applicants more carefully than ever before. Dental schools no longer needed to fill class quotas with all who applied without regard for scholastic grades or dental aptitude. Undoubtedly, many capable students who previously would have been lost to the profession, now with the financial help afforded by the G. I. Bill, were able to enter the field of dentistry.

The candidates themselves were older and more mature, having gained discipline and experience in the service. Many were married, with families and children dependent on their future success. They were serious-minded men, not boys, determined to get from their education what they needed and wanted for their future welfare in a profession. Studies indicate that a person's ability to absorb knowledge increases up to the average age of 25. This group, then, was at the very center of the years of maximum learning.

The last but not least important factor was what the schools had to offer these men for whom they accepted the responsibility of providing a dental education. Whether the training offered since World War II was suddenly improved or whether a gradual improvement has been taking place over the years and became apparent only when applied to a select group of students cannot be answered with authority. In all probability, the improvement was due to a combination of the factors already mentioned: a more careful selection of students; students of greater maturity, wider experience and more serious purpose; improved teaching technics and better planned dental educational programs.

It is not the predental training that has contributed to the progress made.

The time spent in predental courses appears to have had less good effect on the student's training than the time spent in service. Proof of this is found in the letters written by the candidates in the examination on mouth diagnosis. In these letters and in all the examinations candidates who excelled in dental subjects showed a deplorable weakness in expressing themselves in the English language; their spelling and grammar were in general poor and often atrocious.

It is in dental education itself that the improvement has been made. It is true that many more improvements are necessary but as now constituted the dental schools can meet the need. It will do no harm to caution the schools to "hold that line," which has been crossed only through long, hard and united effort on the part of all professional dental groups: schools, boards and the American Dental Association.

How long conditions will permit the present careful selection of dental students is problematical. But it is clear that despite pressures the schools should never again revert to the system of filling quotas without regard for the ability of the applicant.

For a period of years the armed services will continue to give maturity and experience to future dental applicants. Now is the time, however, when dental schools in preparation for the normal war-free years must find the means of providing future students with the experience which they will lack. The predental years, if spent in training more adapted to the dental education which is to follow, could well be made to fill this need. Only in that case could a full four-year predental course, which at the same time would enable the student to reach maturity, be justified. In addition, a well planned postgraduate year, a year to be spent in hospital internship, in a dental school postgraduate course, in institutional or clinic training, or in some other phase of public health work, could be made to contribute experience, a small income and that invaluable something which this present group of candidates possesses.

An interested bystander salutes the dental schools and their graduates. May dental education, the cornerstone of the dental profession, continue not only "to hold the line" but to advance to ever new lines of progress.

Executives • The "Life Extension Examiners" quote the following statistics: of 10,000 business men with an average age of 45.6 years, only 22 per cent were considered in perfect health; *Advertising Age* found that executives who died in 1950 averaged 57¼ years, which is 10 years below the expected life span. At the Michael Reese Hospital in Chicago, in an examination of 55 executives under age 50, it was found that only 5.4 per cent were free of organic disorders. Obesity, hypertension, heart ailments and fatigue were among the leading pathological findings. *Clinical Med., February, 1952.*

Cases and Comments

DENS IN DENTE: REPORT OF THREE CASES

By Philip J. Boyne, Lt. (jg) DC, USN, Seattle

One of the rarest of dental anomalies is dens in dente.

Three cases will be described, one of which represents dens in dente occurring bilaterally. Case 3 demonstrates a less distinct form of the anomaly in which the continuity between the "inner tooth" and the lingual pit appears roentgenographically to be well established. All of these cases involved maxillary lateral incisors which were carious and nonvital and two presented periapical abscesses.

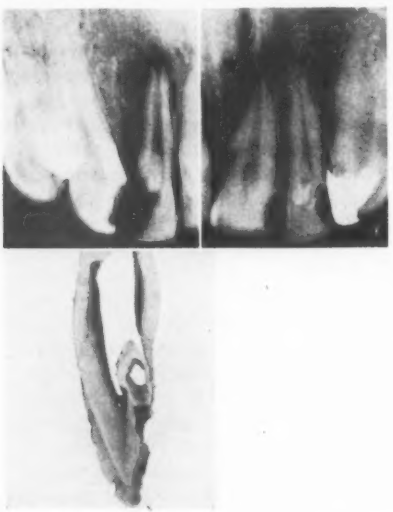

Fig. 1 • Above left: Case 1. Upper left lateral incisor showing toothlike structure in the pulp canal. The "inner tooth" possesses an enamel lined central cavity. Above right: Case 1. Upper right lateral incisor exhibiting an inner toothlike structure with a large well defined central cavity bordered by enamel. Below: Labiolingual ground section of the upper right lateral incisor of Case 1 showing continuity of enamel of the inner tooth with the carious dentin in the floor of the lingual pit

Case 1 • The patient, a 21 year old white male, came to the dental clinic of the U. S. Naval Hospital, Bremerton, Wash., on April 7, 1950, with a complaint of soreness in the region of the left maxillary incisors. Oral examination revealed a draining fistula on the labial surface of the left maxillary alveolar process. Roentgenographic examination revealed a radiolucent area involving the apical third of the root of the left lateral incisor. The coronal third of the pulp cavity was occupied by a "cigar-shaped" radiopaque structure (Fig. 1, above left) having a radiolucent central portion lined by tooth structure with a density approximating that of enamel. Full mouth roentgenograms demonstrated a similar structure in the pulp canal of the right lateral incisor (Fig. 1, above right). No periapical involvement was demonstrable roentgenographically but testing of the pulp indicated the tooth was nonvital. Extraction of both teeth was accomplished under local anesthesia. A labiolingual gingival section (Fig. 1, below) was made of the right lateral incisor demonstrating a toothlike structure protruding into the pulp chamber from the region of the lingual fossa. This structure was lined with enamel surrounded by dentin. The enamel extended into the carious dentin of the floor of the lingual pit.

Case 2 • The patient, a 19 year old white male, reported to the dental clinic of the U. S. Naval Hospital at Bremerton on June 8, 1950, with the complaint of pain and tenderness in the area of the upper left lateral incisor.

Periapical roentgenograms (Fig. 2, left) revealed a calcified toothlike body occupying the coronal fourth of the pulp canal and the entire pulp chamber. A central radiolucent area surrounded by the tooth structure having the density of enamel was present in the "inner tooth." A silicate restoration and underlying cement base were removed from the lingual portion of the tooth. A putrescent root canal was found to be present. Instrumentation of the canal for endodontic treatment was unsuccessful because of the calcified mass in the coronal portion. Extraction was accomplished under local anesthesia.

Case 3 • The patient, a 20 year old Malayan steward's mate, reported to the dental office of the U.S.S. Montrose on December 6, 1950, with the complaint of a "dull ache and sore

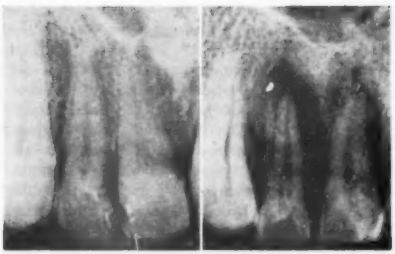

Fig. 2 • Left: Case 2. Upper left lateral incisor exhibiting an "inner tooth" apparently extending incisally to the cement base of the restoration in the lingual fossa. Right: Case 3. Demonstrating the continuity of the enamel of the lingual pit with the enamel lining the central cavity of the inner calcified mass

gums" in the upper left maxilla. Extensive caries was present on the lingual surface of the left lateral incisor. Roentgenograms (Fig. 2, right) revealed a large radiolucent periapical area involving one third of the root of the left lateral incisor. The coronal portion of the pulp cavity was occupied by a calcified mass, the central portion of which was radiolucent. The enamel of the lingual pit appeared roentgenographically to be continuous with the lining of the inner calcified mass. This case, of the three presented, more clearly illustrates the close relationship between these endodontic calcified masses, termed "dens in dente," and deeply invaginated areas on the external surfaces of the teeth; that is, abnormalities of the fossae of the maxillary lateral incisors.

These dental anomalies are of more than academic interest for they afford an insight into the morphogenetic processes of tooth development. The four specimens presented here are the result of examination of approximately a thousand roentgenograms of maxillary incisors. Assuming these to be the most frequently involved teeth, this could conceivably indicate a higher incidence of dens in dente than is implied by the number of cases reported in the literature. It is suggested that, since this anomaly is not in reality a "tooth within a tooth," the term "dens in dente" should be abandoned in favor of more applicable nomenclature.

U. S. Naval Receiving Station

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

MAKING ROENTGENOGRAMS OF TEMPOROMANDIBULAR ARTICULATION

By Lewis B. Spear, D.D.S., and Alvin J. Grayson, B.S., Indianapolis*

The making of roentgenograms of the temporomandibular joints is at best a difficult procedure. To keep the angulation of the rays and the position of the head exactly the same for the open and closed positions of the mandible on each side and be able to duplicate these positions at some future time has been practically impossible. Since duplication is essential to accurate interpretation and follow-up roentgenograms, a device has been designed which makes this possible (Fig. 1). In mechanics a device which is made to duplicate angles and operations is called a "jig"—so this device is essentially a jig.

The jig described was designed to make two lateral exposures, the open and closed positions, on one 8 by 10 film. The plane on which

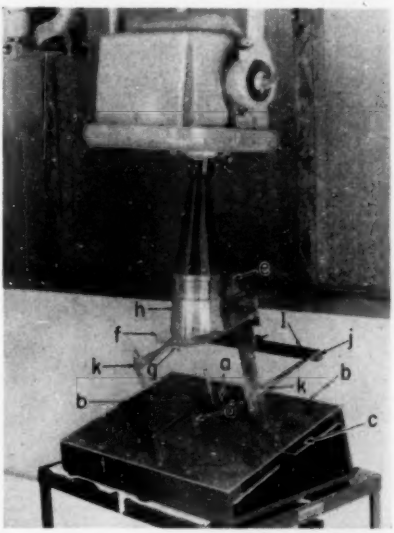

Fig. 1 • Jig designed to make two lateral exposures. a: plane on which head rests; b: radiopaque material below plastic covering; c: slot which supports cassette; d: ear plug; e: vertical column; f: adjustable acrylic plate; g: ear plug; h: device for accurate control of position and angulation of rays; j: sliding horizontal bar; k: acrylic nose rest; l: calibrated scales

the head rests (a) is 50 per cent longer than the length of the cassette and is covered with a thin sheet of acrylic resin, which is radioparent. Each end of the plane is covered below the plastic covering with some radiopaque material (b). The width of each piece of this material is one-half the length of the cassette. Directly beneath this is a slot (c) which supports the cassette and allows it to be moved lengthwise. The cassette is placed in the slot with one-half of the film exposed to radiation, and one exposure made, open or closed position; the cassette is then moved in the slot so that the other half of the film is exposed to radiation and the second exposure of that side made.

To duplicate the angles a small plug (d) projects from the center of the exposure portion of the head rest plane. The patient rests the head laterally on this plane with the plug extending slightly into the external auditory canal. Attached to the head rest is a vertical column (e) carrying a vertically adjustable acrylic plane (f) which has an ear plug (g) that is always directly opposite the ear plug in the head rest. Also attached to this adjust-

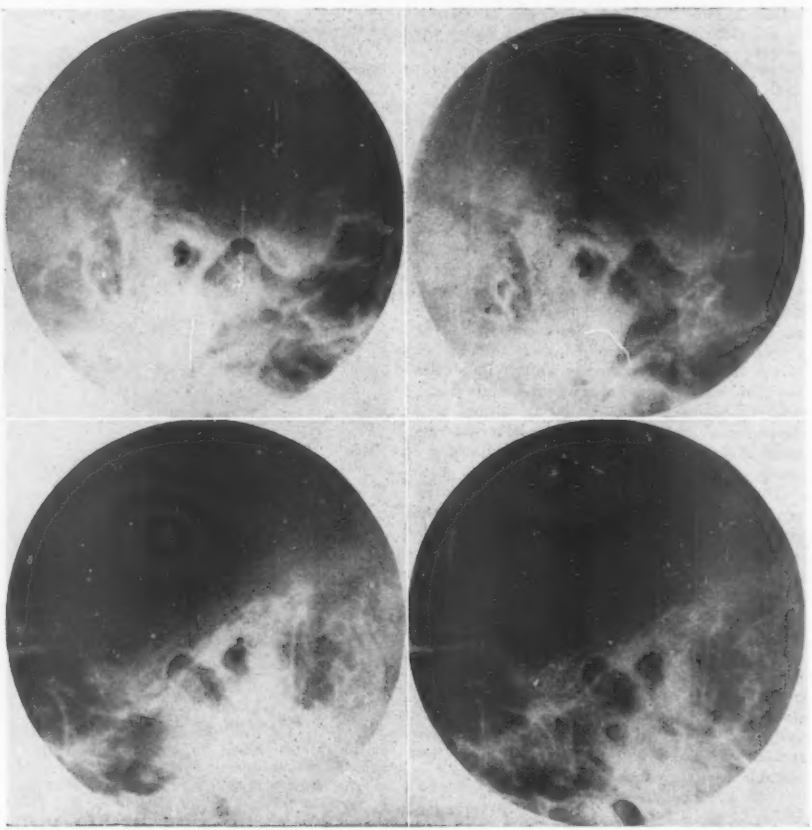

Fig. 2 • Above: Left side of mandible showing temporomandibular joint in closed and open position. Below: Right side of mandible showing joint in closed and open position

able plane is a device (h) which will accurately control the position and angulation of the rays. In the case of this particular jig it is a cylinder into which the cylindrical cone end of the x-ray machine snugly fits.

To control the rotation of the head about the ear plugs a long, sliding horizontal bar (j) is attached to the vertical column at the proper height. Projecting forward, over the head rest, from each end of the sliding horizontal bar is a rod fitted with an acrylic nose rest (k). The bar is moved horizontally until the proper nose guide is resting in the nasion. On top of the horizontal bar are calibrated scales (l) extending each way from the center of the bar. When the head is properly positioned for one side, the reading of the scale is taken, and with the same reading on the opposite scale when making roentgenograms of the other side, duplication of position and angulation will result (Fig. 2). If the reading of the nose rest scale is recorded for adult patients, duplicate views can be made at any future date, unless, of course, trauma or disease has changed the shape of the nose. In growing children, if the nose rest is placed securely in the nasion at subsequent sittings, reasonably accurate duplications can be made since these landmarks remain almost parallel during growth.

This device can be used to advantage in growth studies of children, preoperative and postoperative roentgenograms of pathologic temporomandibular joints, and studies of unusual movements of the mandible in denture construction.

*Head of department of radiology, Indiana University School of Dentistry.

Public Health • Public health protection means: sanitation, communicable-disease control, recording of vital statistics, laboratory services, protection of maternal and child health, detection of chronic disease, and health education. These are the seven basic responsibilities of local health units, of which the Council of the Massachusetts Medical Society, through its committees on national legislation and medical economics, says: "It is acknowledged universally that the seven basic responsibilities attributed to local health units by Dr. Haven Emerson are to a great extent a governmental responsibility." *Editorial, New England J. Med., February 28, 1952.*

COUNCIL ON DENTAL THERAPEUTICS

Prophylactic use of penicillin in oral surgery

The following informative report has been prepared by the Council in view of suggestions that orally administered penicillin might be suitable for prophylactic use in oral surgery patients who have a history of rheumatic heart disease.

There is a critical need for adequate protection of the patient from certain secondary infections arising by way of bacteremia following dental extractions or other oral surgery. The dentist frequently encounters the situation where surgical procedures must be carried out even in the presence of acute infection. The danger from postextraction bacteremia is most imminent in the case of patients who exhibit a past history of rheumatic fever or of valvular heart disease, and it is toward these individuals in particular that protective preparatory procedures should be directed.

In prophylactic therapy, contrasted with the treatment of existing pathologic manifestations, the dentist has no symptomatic criteria by which to evaluate beforehand the adequacy of the measures he employs. If the dose of antibiotic has been too low to prevent secondary infection, the signs of endocarditis, for example, do not appear until the infection is well established. It is, therefore, of the highest consequence that adequate amounts of the drug be circulating in the blood before, during, and for some time after the surgical operation.

The dentist may employ intramuscular injections of a soluble form of penicillin, which is rapidly absorbed and promptly produces a high but transient concentration in the blood. At the same time, the patient should receive a large dose either of a penicillin G procaine preparation in oil or aqueous suspension for injection, or of a suitable penicillin salt for oral administration. All of the latter dosage forms are absorbed slowly and diffuse gradually into the blood stream. In addition, the penicillin when taken orally is subject to considerable destruction by the gastric fluids so that relatively large doses are required in order to ensure that an effective blood level of penicillin will be established. A second injection of procaine penicillin, or prolonged administration of the oral preparation, may be necessary.

It is generally believed that the intramuscular injection of the procaine penicillin will produce the desired blood concentrations more consistently than will the oral dosage forms. This is because the rate at which the drug is absorbed from the intestinal tract is subject to wide variations amongst different individuals, and is related to the presence or absence of food in the stomach. The use of penicillin orally, however, obviates the necessity for repeated injection, and this feature may be considered advantageous in certain circumstances.

In view of the suggestions for the prophylactic use of tablet forms of penicillin, the Council on Dental Therapeutics has adopted the following statement to delineate its requirements concerning the

acceptability of claims made for brands of penicillin tablets for oral administration for systemic effect:

Because of the variability in the absorption of penicillin when administered in oral dosage forms, the Council on Dental Therapeutics has not recognized orally administered penicillin *alone* as an adequate prophylactic measure in connection with dental extractions and other oral surgery in patients with a history of rheumatic heart disease.

The Council has recognized the usefulness of penicillin tablets in this situation used prior to and following extractions when suitable parenteral administration of crystalline penicillin with or without procaine penicillin is employed within a period of approximately one-half hour prior to the oral surgery.

The Council recognizes the following procedures and doses as minimum precautionary measures against the hazards of postoperative bacteremia.

About one-half hour before operation, the patient should receive intramuscularly 300,000 units of crystalline penicillin with 600,000 units of procaine penicillin. These dosage forms are available separately or in combination. If desired, the crystalline penicillin alone may be given parenterally, along with at least 200,000 units of the buffered oral form at once and at intervals of 4 to 6 hours thereafter.

It must be emphasized that for maximal absorption to occur, the oral dosage forms should be taken at least one-half hour before or at least two hours after meals.

Postoperatively, the patient should receive an additional injection of 600,000 units of procaine penicillin intramuscularly 18 to 24 hours later. As an alternative, the oral preparation should be administered periodically for 48 hours.

It is advisable, particularly in patients with extensive periodontal infection or apical abscesses, to start the antibiotic therapy the day before operation and continue one or two subsequent days.

Council classifies Pulpdent in Group B

The Council on Dental Therapeutics has classified Pulpdent, a Special Paste of Calcium Hydroxide (Rower Dental Mfg. Corporation), in Group B for a period of one year.

Pulpdent, a brand of calcium hydroxide paste, has been submitted to the Council by the Rower Dental Mfg. Corporation. The distributor states that Pulpdent contains calcium hydroxide, 52.5 per cent and methyl cellulose (3% aqueous solution), 47.5 per cent. The product is marketed as a ready-prepared paste for use in pulp capping, pulpotomy and cavity lining.

Experimental studies[1] with this product in the teeth of dogs revealed that the material was well tolerated, as evidenced by histologic sections, and that secondary dentin bridges appeared between the paste and the pulp tissue.

There is considerable evidence which indicates that calcium hydroxide-water pastes are suitable for treating vital human pulps.[2,3,4] While there is insufficient evidence from controlled clinical studies to warrant the classification of this prod-

1. Berk, Harold. The effect of calcium hydroxide-methyl cellulose paste on the dental pulp. J. Den. Children 17:65 (Oct.) 1950.

2. Zander, H. A., and Glass, R. L. Pulp healing. J. D. Res. 28:97 (April) 1949.

3. Tananbaum, N. I. Pulp capping with zinc oxide-eugenol and calcium hydroxide: clinical studies on 135 patients. J. Den. Children 18:16 (third quarter) 1951.

4. Cohen, B. The use of calcium hydroxide for capping exposed pulps: a report on 239 cases. J.D.A. South Africa 6:182 (May 15) 1951.

uct in Group A, the Council believes that the evidence of its safety and usefulness is adequate at this time to warrant classification in Group B.

In keeping with the Council's policy, the status of the product may be reviewed when a substantial body of new evidence becomes available.

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics of the American Dental Association has been described in a previous report (*J.A.D.A.* 40:489, April, 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions of acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies*, and may use the Seal of Acceptance, unless otherwise provided.

The following additional product is classified in Group A:

Penicillin G Potassium Tablets, 200,000 Units (E. R. Squibb & Co.): Stated to contain penicillin G potassium, calcium carbonate and excipients. Trademark: Pentids. (See report on page 212.)

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics and the Division of Chemistry. It is the Council's opinion that Group B products may be promoted for special use and study.

The following additional product is classified in Group B:

Pulpdent,[1] *A Special Paste of Calcium Hydroxide* (Rower Dental Mfg. Corp.): A paste for use in pulp capping, pulpotomy and cavity lining, each 100 grams of which is stated to contain calcium hydroxide, 52.5 Gm., in a 3 per cent aqueous solution of methyl cellulose. (See report on page 213.)

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

1. Trademark. Patent applied for.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Relocation of dentists during 1950 and 1951

To most dentists with established practices, there are two important factors which contraindicate moving from one state to another: licensure requirements and the length of time required to build a new practice. Nevertheless, during 1950 and 1951 a total of 2,018 dentists moved from one state to another. The total number of dentists moving from state to state, in or out of federal dental services, and to or from United States territories and possessions and foreign countries, was 5,792 (Table 1). This compares with a total of 3,738 for 1948 and 1949, when 1,883 dentists moved from state to state.[1]

There was a tendency for dentists who relocated to move to adjacent or nearby states. When the states are grouped into the seven standard regions listed in Table 2, it is shown that 626 dentists moved to states within the same region, 628 moved from the seven regions to 15 adjacent regions, and only 764 moved from the seven regions to a total of 27 nonadjacent regions. Of the 136 New England dentists who moved to another state, only 12 moved to the Far West. Of the 503 dentists in the Middle East who moved to another state, only 33 moved to the Far West. Of the 238 dentists in the Far West who moved from state to state, only 10 moved to New England and 18 to the Middle East.

The regions which made a net gain of dentists through region-to-region movement were the Southeast (190), the Far West (124), the Southwest (84) and the Northwest (12). The following regions incurred a net loss: Central (251), Middle East (139) and New England (20). In relation to the number of dentists in the region in 1950, the greatest gain through relocation was made by the Southwest, followed by the Southeast, Far West and Northwest. The greatest percentage loss was suffered by the Central states, followed by the Middle East and New England.

The six states which incurred the greatest net loss of dentists through state-to-state relocation were New York (134), Illinois (79), Michigan (56), Minnesota (36), Wisconsin (32) and Iowa (31). In relation to the number of dentists in the state at the outset of the period the greatest net loss occurred in Nevada, Montana, Iowa, Oregon, Michigan and Kentucky, in that order.

The six states with the largest net gain of dentists from state-to-state movement were California (139), Florida (125), Texas (49), Virginia (45), Colorado (26) and Arizona (21). Percentage-wise the greatest net gain occurred in Florida, Arizona, New Mexico, Wyoming, Virginia and Colorado, in that order.

If dentists entering the federal services are included in the relocation count, an over-all gain is recorded for only eight states. Over 3,000 dentists were tallied as having entered federal service during the period while less than one sixth as many were tallied out of federal service. It should be borne in mind that these figures do not include new graduates going directly into service. It is likely, too, that a sizable number of

1. For the relocation study covering 1948 and 1949, see The Journal, Nov. 1950, p. 631-635. The current study and the 1948-1949 study were both based on changes of address of dentists listed in supplements to the American Dental Directory. Retired dentists are included.

Table 1 • Relocation of dentists during 1950 and 1951

MOVED FROM ↓ / MOVED TO →	ALABAMA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	DIST. OF COLUMBIA	FLORIDA	GEORGIA	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI	MISSOURI	MONTANA	NEBRASKA
ALABAMA									3	3		2														
ARIZONA																						1				
ARKANSAS															1									1		
CALIFORNIA	1	5	2		3	4		1		1	2	8	2	2			1		1	4	4	7		3	2	3
COLORADO				6								1														
CONNECTICUT	1			1	1				9				1							7						2
DELAWARE																										
DIST. OF COLUMBIA									5			2		1					12					1		2
FLORIDA	1	1		4		4		2		7		5	2			5	1		2	5	7	1			1	
GEORGIA	1							1	10			1						1		1	1					
IDAHO				3																						
ILLINOIS	1	11	4	43	5			4	20				7	7	3	1	2		6	2	9	1	1	9		
INDIANA	1			2		1			10			7				1			1		3					
IOWA		1		12				1	3	1	1	5			2							1		2		2
KANSAS				3	5			1				2								1				10		
KENTUCKY									1	1			5						1					1		
LOUISIANA	2			2					1	1		1				1				1			1	2		
MAINE								1												4	1					
MARYLAND	1		1	2				9	3			2						1				1				
MASSACHUSETTS	3	1		5		4	1		8	1		1			1	1		6	2			1		2		
MICHIGAN		3		13	3	2			23	1	1	10	6			1	1	1						3		
MINNESOTA		1		23	3				3			4	1	1					1	1				2	1	1
MISSISSIPPI	2								1			1					1									
MISSOURI	1		2	6	4	1	1		3			5			12		1				1					
MONTANA				7				1				1														
NEBRASKA	1			5	5							1		2												
NEVADA				4																				2		
NEW HAMPSHIRE									1											3						
NEW JERSEY				6				1	16	1		4	1				1	1	5							
NEW MEXICO		1		4	1				2			3			1		1			2		1				
NEW YORK	3	2	2	21	2	15		6	47	4		9	3				2	4	5	7	4	3	3	2		
NORTH CAROLINA						1				3						1										
NORTH DAKOTA				1																		3			1	1
OHIO	1			13					7	1		9	2			5	2				5					
OKLAHOMA	1		2	1	1							2			1		1							2	1	
OREGON		2		12					1		1	2									1			1	1	
PENNSYLVANIA	1	2		1				3	19	1		6	1				2		5	4	2					
RHODE ISLAND				1															1	1						
SOUTH CAROLINA									1	1																1
SOUTH DAKOTA																			1						1	
TENNESSEE	2	1	2		2				2	3		1					2				1		3			
TEXAS	2			9	1			1	3	1	2	4		1		1	4				1			2		1
UTAH				11				1			2															
VERMONT								1				1								1						
VIRGINIA				2				8	3				1								1					1
WASHINGTON				21				2				4	2	1								4		1	3	3
WEST VIRGINIA									3			1							1	1						
WISCONSIN		2	1	12	1			1	6			9	2						1		5	2	2	2	1	
WYOMING				1																				1		1
FEDERAL SERVICES*	5	1		67	11	3	1	7	11	3	1	16	3	6	5	3	10	1	11	16	10	5		11	1	3
OTHER †				5				1		1		3	1									1		1		
TOTAL	31	34	16	337	48	35	3	53	225	35	10	133	40	21	26	20	32	15	56	61	56	32	10	61	13	21

NEVADA	NEW HAMPSHIRE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING	FEDERAL SERVICES*	OTHER†	TOTAL	MOVED TO ← / MOVED FROM ↓
				1								2						1					27	1	40	ALABAMA
			3					1		1													13		25	ARIZONA
					3									1		1						1	22		32	ARKANSAS
1		1	7	6	2		6	4	4	3	1	2			6	4		2	18		3		297	9	432	CALIFORNIA
			1					1														2	25		36	COLORADO
		3	4	5						1		1			1			1					53		91	CONNECTICUT
										1															1	DELAWARE
		1		3						3								6	1	2			32		71	DIST. OF COLUMBIA
	1	7	1	5	4		7			5		1		2	3			2	1	2			55		144	FLORIDA
			1	1	4							4		1	2			1					58		88	GEORGIA
																			3				6		12	IDAHO
	1	2	7	5	3	4	4	2		3			1	1	10	2		3	1		8		207	4	404	ILLINOIS
	1			1			1			1		2			3								55	2	92	INDIANA
								1	1	2					4			1	1		2	3	41		87	IOWA
			1					2							1								32		58	KANSAS
				3	3		8	1						6	1			2					44		77	KENTUCKY
		1		2			2								8								49		74	LOUISIANA
				1																			17		24	MAINE
		1		7			1			3					2			4		2			43		83	MARYLAND
2	3	3	1	8			2		1	2	2	1			1		4	1	1				91	1	161	MASSACHUSETTS
	1			7			5			6				2	3			3		1	6		81	1	184	MICHIGAN
		2		1	1	2	1		2				2	1				1	4		3		63	2	127	MINNESOTA
				1										7	2			1					34		50	MISSISSIPPI
			2	2			1			2				1	8			1		1	1	2	85	1	144	MISSOURI
			1						4						1				4				13		32	MONTANA
			1				1						1					1	2		1	1	32		54	NEBRASKA
																1							3		10	NEVADA
				1			1			1	2						1			1				13		24	NEW HAMPSHIRE
				24	2		3	1		11							1	3			1		143		225	NEW JERSEY
				1				2						1	1					1			10		32	NEW MEXICO
		37			3		7	1		15	2			2	14	1	3	12	1	2	1	1	551	6	803	NEW YORK
				3						1		4		1	1			3	1				58		77	NORTH CAROLINA
									3										2				4		15	NORTH DAKOTA
				6	1					4					2			3			1	1	132	1	196	OHIO
															6								47		65	OKLAHOMA
											1			4		5			16	1			40		88	OREGON
		11		9			1					1		3	4			4		1			202	3	286	PENNSYLVANIA
				1					1	1													18		24	RHODE ISLAND
					2		1											1					31		38	SOUTH CAROLINA
								1	1									1	2				7		14	SOUTH DAKOTA
		2		3	5		2			1					5						1		59		97	TENNESSEE
			3					3		1		1						2	2	1			124		170	TEXAS
1									1										1				22		39	UTAH
										1								1					3		8	VERMONT
		1								1				1			1						52		72	VIRGINIA
					3				8						2	1					2		51	1	109	WASHINGTON
				2			1		1						2			2					27		41	WEST VIRGINIA
				3		2	1	1	2				1		2			2	1				88		150	WISCONSIN
																			1				3		7	WYOMING
	1	15	3	64	1		15	7	5	18	1	1		8	11		1	12	10	4	12		124	4	528	FEDERAL SERVICES*
									1						4				2				29	2	51	OTHER†
4	8	87	36	176	37	8	71	28	35	88	9	20	5	42	110	15	11	77	75	19	42	11	3316	38	5792	TOTAL

*Federal Services are Army, Navy, Air Force, Public Health Service and Veterans Administration.

†Other includes Alaska, Canal Zone, Hawaii, Puerto Rico, Marianas Islands, Guam, Marshall Islands and foreign countries.

Source: Supplements to the American Dental Directory, April 1950 through March 1952.

dentists going into service temporarily did not inform the Association of their change of address or status.

It has been observed that dentist-population ratios are highest in areas of high per capita income. Table 3 shows remarkably similar rankings of states according to (1) per capita income in 1950 and (2) ratio of dentists to population in 1950. The coefficient of correlation of the two rankings is plus .80.[2] The 10 states with the highest dentist-population ratios had a per capita income of $1,713 in 1950 compared to $990 in the 10 states with lowest dentist-population ratios. These figures denote a very close positive relationship between per capita income and dentist concentration. There is reason to believe that with a more accurate count of dentists the relationship would be even closer.

However, the dentists who relocated during the period under study tended to go not to the high per capita income states but to the states needing dentists. When states are ranked according to (1) 1950 per capita income and (2) net change in number of dentists through state-to-state relocation as a percentage

2. Correlation coefficients were computed according to the following formula for rank-order correlation: $R = 1 - \frac{6 \Sigma d^2}{N (N^2 - 1)}$. A perfect positive correlation is plus 1.00; a perfect negative correlation is minus 1.00.

Table 2 • Regional relocation of dentists during 1950 and 1951

Moved to → / Moved from ↓	New England	Middle East	South-east	South-west	Central	North-west	Far West	Federal Serv-ices	Other	Total
New England (Conn., Maine, Mass., N.H., R.I., Vt.)	38	35	29	8	10	4	12	195	1	332
Middle East (Del., D.C., Md., N.J., N.Y., Pa., W. Va.)	39	182	157	28	58	6	33	998	9	1,510
Southeast (Ala., Ark., Fla., Ga., Ky., La., Miss., N.C., S.C., Tenn., Va.)	15	54	128	29	53	8	12	489	1	789
Southwest (Ariz., N. Mex., Okla., Texas)	2	6	22	20	17	9	22	194		292
Central (Ill., Ind., Iowa, Mich., Minn., Mo., Ohio, Wis.)	11	65	134	61	154	59	137	752	11	1,384
Northwest (Colo., Idaho, Kans., Mont., Neb., N. Dak., S. Dak., Utah, Wyo.)	1	4	3	10	23	20	62	144		267
Far West (Calif., Nev., Ore., Wash.)	10	18	16	26	55	29	84	391	10	639
Federal Services (Air Force, Army, Navy, Public Health Service, Vet. Adm.)	23	120	54	22	78	21	82	124	4	528
Other (U.S. territories and possessions and foreign countries)		1	1	4	6		8	29	2	51
Total	139	485	544	208	454	156	452	3,316	38	5,792

Table 3 • States ranked by per capita income and by ratio of dentists to population in 1950, and change in number of dentists through state-to-state relocation in 1950 and 1951

State	Rank in per capita income 1950	Rank in ratio of dentists to population 1950	Net change in number of dentists through state-to-state relocation 1950-1951	Rank in proportionate net change through state-to-state relocation*
Alabama	46	47	+14	10
Arizona	33	38	+21	2
Arkansas	48	46	+6	14
California	7	10	+139	11
Colorado	24	17	+26	6
Connecticut	5	5	−6	31
Delaware	2	32	+1	17
Dist. of Columbia	1	2	+6	16
Florida	34	28	+125	1
Georgia	42	44	+1	23
Idaho	29	33	+3	15
Illinois	6	6	−79	40
Indiana	20	24	+1	24
Iowa	22	13	−31	47
Kansas	25	20	−5	33
Kentucky	45	41	−16	44
Louisiana	41	34	−3	27
Maine	36	27	+7	12
Maryland	15	35	+5	18
Massachusetts	11	4	−24	35
Michigan	12	23	−56	45
Minnesota	26	3	−36	43
Mississippi	49	48	−6	39
Missouri	23	14	−9	29
Montana	10	22	−7	48
Nebraska	19	8	−4	32
Nevada	3	18	−3	49
New Hampshire	30	25	−4	42
New Jersey	8	11	−10	28
New Mexico	38	45	+11	3
New York	4	1	−134	37
North Carolina	44	43	+17	13
North Dakota	28	31	−3	38
Ohio	13	21	−7	25
Oklahoma	39	37	+3	20
Oregon	16.5	9	−19	46
Pennsylvania	16.5	15	−11	26
Rhode Island	14	16	+2	19
South Carolina	47	49	+12	8
South Dakota	27	29	−2	36
Tennessee	43	40	−4	30
Texas	31	42	+49	9
Utah	32	19	−2	34
Vermont	35	30	+5	7
Virginia	37	39	+45	5
Washington	9	12	+6	21
West Virginia	40	36	+1	22
Wisconsin	21	7	−32	41
Wyoming	18	26	+7	4

* The state with greatest net gain through relocation, computed as a percentage of all dentists in the state in 1950, is ranked 1, and the state with greatest proportionate loss is ranked 49.

of the number of dentists in 1950, a correlation coefficient of minus .30 is obtained. A coefficient of plus .44 was obtained between the rankings according to (1) need for dentists based on the 1950 dentist-population ratio and (2) proportionate net change in number of dentists from state-to-state relocation. The 10 states which made the greatest percentage gain of dentists through state-to-state relocation averaged 3,050 persons per dentist in 1950, compared to 1,604 persons per dentist in the 10 states with the greatest net loss (Table 3). Thus it is obvious that dentists who moved from one state to another during this period actually counteracted to some extent the existing concentration of dentists in states of high per capita income. This trend was also apparent in the relocation study covering 1948 and 1949.

In general, then, most dentists who move to another state will choose a state in the same or an adjacent region. The states which are gaining through relocation are the Southern and Western states; the states which are losing are the Eastern and Central states. Although dentist-population ratios are high in states of high per capita income and vice versa, dentists who relocate go to states most in need of dentists rather than to high income areas.

B. Duane Moen, Director

COUNCIL ON DENTAL HEALTH

Progress report on fluoridation

The number of communities now receiving fluoridated water stands at more than 300. The total includes the names of communities in Maryland and Georgia counties, previously reported as having fluoridation projects in operation, plus additional projects reported in other areas. In Maryland, the water supplies of some 60 communities are fluoridated by two projects through action of the overall authority.

An additional 270 communities in the continental United States have approved this public health measure for future adoption. These include such large cities as Fort Worth, Tex., whose population of 278,778 makes it the fourth largest in the state, and Reading, Pa., with a population of 109,320.

The revised edition of the American Dental Association's booklet, *Fluoridation in the Prevention of Dental Caries*, incorporates the new data on the progress of fluoridation.

Outside the continental U. S. limits, too, the public health measure is gaining acceptance. The Panama Canal Zone water supply provides fluoridated water for all of the Canal Zone as well as Colon and Panama City and its suburbs as far as Juan Diaz. In Alaska, the procedure has been approved for Anchorage. Kilmarnock, Scotland, will be the first city in Great Britain to fluoridate its water supply, according to *Dental News* for May.[1] Half of the city will receive

1. Dental News, Federal Security Agency, Public Health Service, Issue No. 28, May 1952.

fluoridated water while the other half will serve as a control.

A new trial to halt San Diego's plans to fluoridate the municipal water supply was denied May 7 in Superior Court. The suit was based on the contention that fluoridation amounted to mass medication and was contrary to the individual's constitutional right to choose his own medicine or treatment. The city, which previously obtained a nonsuit against a petition to restrain the program, plans to commence fluoridation as soon as materials and equipment are procured, according to J. B. Askew, director of public health, although an appeal for a higher court review of the case is expected.

Opponents of fluoridation have charged that adoption of this public health measure would violate the 10 standards which the International War Crimes Tribunal at Nuremberg found to be essential to safeguard human beings from becoming subjects of medical experimentation. In reply to a recent request from A. Gold, Springfield, Mass., a dentist, for an authentic explanation of this erroneous concept, Leo Alexander, Boston physician and a medical adviser to the Nuremberg Tribunal commission, wrote as follows:

> In my opinion the dragging in of our well thought out principles on human experimentation into the problem of fluoridation of water is a scurrilous bit of sophistry based on the distortion of the main fact; namely, that such a public health measure could possibly be construed to be human experimentation in the sense of those experiments to which our principles are to be applied.
>
> It seems to me that the basic part of the work on fluoridation that could be construed as experimentation had actually been done long ago by nature itself. From the literature submitted it appears that a great many competent investigators have proven the fact that fluorine concentration of drinking water between 1.2—3 p.p.m., occurring naturally in many localities, is perfectly innocuous. Since then the proposed fluoridation of water can no longer be regarded as an experiment in the sense of our 10 rules.

The public need not worry about what fluorine will do to their lawns, according to *Lawn Care*, published by O. M. Scott & Sons Co., Marysville, Ohio, producers of grass seed, fertilizer and items for lawn care.[2] Many of the company's test lawns, irrigated for years with city water having a natural fluorine content in the amount recommended by dentists, have thrived year after year, the publication reported recently.

The impossibility of controlling the amount of fluoridated food an individual might eat was the reason given by the late James Nuckolls why fluorides could not be added to foodstuffs.[3] Formerly professor of oral pathology and oral histology and chairman of the division of preclinical sciences at the University of California College of Dentistry, Dr. Nuckolls pointed out that the average individual does not consume water beyond the normal metabolic requirement and, therefore, would be inclined to ingest less than an excessive amount of fluoride.

Reviewing the history of chlorination, the May issue of *Dental News*[1] called attention to the difficulties encountered in instituting that public health measure. Chlorination was first introduced in the United States around 1908 and, as late as 1939, opponents of chlorination in Bellingham, Wash., "complained that it increased gastrointestinal diseases, caused cancer and other systemic illnesses and 'dezincification of hot water heaters.' " The issue called attention to the parallel that exists between those difficulties and the ones encountered today by the advocates of fluoridation.

An analysis of Rep. A. L. Miller's statements which appeared in the *Congressional Record* March 24 and May 7, 1952, has been prepared by the Council on Dental Health. Copies are available.

2. Lawn Care 12:4 (May) 1952. Marysville, O., O. M. Scott & Sons Co.

3. News Letter, California State Dental Association, Vol. 5 (May 23) 1952.

COUNCIL ON DENTAL EDUCATION

Additional dental internship and residency programs approved

The Council on Dental Education and its Committee on Dental Internships and Residencies have reviewed the applications from a number of hospitals for approval of their educational programs. These hospitals have had their dental departments approved by the Council on Hospital Dental Service and the inspectors of that Council have inspected the educational program and facilities of these hospitals. These inspectors have reported on the manner in which the programs agree with the Requirements for the Approval of Hospital Dental Internship and Residency Programs developed by the Council on Dental Education and approved by the House of Delegates of the American Dental Association in October 1946.

The Council on Dental Education and its Committee on Dental Internships and Residencies voted at the meeting held in Chicago on May 15, 1952, to approve the educational programs in the hospitals listed in the accompanying table. The area or areas for which approval has been given, as well as the type of program, are also indicated.

Table • Hospitals and programs which have been approved

Hospital	Type of program	
	Internship	Residency
The Delaware Hospital, Inc. 501 West 14 Street Wilmington, Delaware T. E. Hinkson, D.D.S., Director of Division of Dentistry	Straight Oral surgery Anesthesia Oral pathology Radiodontics	
Charity Hospital of Louisiana 1532 Tulane Avenue New Orleans 12, Louisiana F. J. Houghton, D.D.S., Chief Loyola University Dental Unit L. L. Levy, D.D.S., Chief Independent Dental Unit	Straight Oral surgery	
Worcester Memorial Hospital 119 Belmont Street Worcester, Massachusetts Robert W. Hornbaker, D.M.D. Chief of the Dental Service	Rotating Oral surgery Operative dentistry Pedodontics Orthodontics Anesthesia Oral pathology Prosthodontics Endodontics Radiodontics Periodontics	

Hospital	Type of program	
	Internship	Residency
Bellevue Hospital First Avenue & 28 Street New York 16, New York Wm. F. Harrigan, M.D., D.D.S. Chief of Dental Staff	Mixed Operative dentistry Oral surgery Pedodontics Orthodontics Anesthesia Radiodontics Diagnosis	Straight Oral surgery Anesthesia
Beth Israel Hospital Stuyvesant Square East New York 3, New York Irving Salman, D.D.S. Chief of Dental Staff	Rotating Oral surgery Pedodontics Orthodontics Anesthesia Oral pathology Prosthodontics Periodontics Endodontics Radiodontics	
Coney Island Hospital Ocean Parkway and Avenue Z Brooklyn 35, New York A. J. Abeloff, D.D.S., Director of Dental Department	Mixed Oral surgery Periodontics	
Mary Immaculate Hospital 152-11 89 Avenue Jamaica 2, New York Joseph J. Stahl, D.D.S., Chief of Dental Staff	Rotating Oral surgery Pedodontics Orthodontics Anesthesia Oral pathology Periodontics Endodontics Radiodontics	
Meadowbrook Hospital (Nassau County Public General Hospital) P. O. Box 108 Hempstead, New York Wm. F. Harrigan, M.D., D.D.S., Chief Dental Staff		Straight Oral surgery Anesthesia Oral pathology
Sea View Hospital Staten Island 14, New York I. E. Gruber, D.D.S., Director Department of Dentistry	Rotating Oral surgery Pedodontics Orthodontics Anesthesia Oral pathology Prosthodontics Periodontics Endodontics Radiodontics	
Miami Valley Hospital 134 East Apple Street Dayton 9, Ohio L. F. Patterson, M.D., Chief of Dental Staff	Mixed Oral surgery Pedodontics Anesthesia Oral pathology Prosthodontics	

COUNCIL ON LEGISLATION

Congressional report asserts dental fees too high; Legislative Council chairman protests to Committee

The following letter was sent by E. Harold Gale, chairman of the Council on Legislation of the Association, to the Honorable Clarence Cannon of Missouri, chairman of the House of Representatives Appropriations Committee. It is self-explanatory. Copies of the letter have been sent to every member of the Appropriations Committee and to the secretaries of each constituent dental society.

Hon. Clarence Cannon, Chairman
Committee on Appropriations
House of Representatives
Washington 25, D. C.
Dear Mr. Cannon:

I have just had called to my attention House of Representatives Report No. 1517, submitted by your Committee on March 14, 1952, through Mr. Thomas of Texas. This report is in reference to HR 7072, the so-called Independent Offices Appropriation Bill, 1953.

On page 20 of that report there is a tabulation of reductions in appropriations requests, including one item of $4,044,550 for contractual medical and dental fees. The Committee supports this reduction with the language quoted below:

"In making the above reduction in other contractual services, *the Committee is impressed with the fact that medical and dental fees are too high* and has allowed $4,044,550 less than the estimates for this purpose. This is not intended to prohibit the pay of specialists who perform highly technical operations, but is applied to routine fees which should be adjusted in line with the reduction."

On behalf of the American Dental Association, whose membership includes more than 80 per cent of the licensed dentists in the United States, one-third or more of whom are veterans, I wish to protest against the language used in the above paragraph with particular attention to that italicized. I recognize that the language was drafted by the subcommittee which considered the bill, but it could not have been presented to the House without the concurrence of the membership of the full committee and must therefore be taken to be the expression of each member of that group.

In its reference to fees, the Committee has in mind the so-called "hometown service" program of the Veterans' Administration. The fees for services under that program are established in accordance with a schedule mutually agreed upon, between representatives of the Veterans' Administration and representatives of the dentists practicing in each state, as fair and reasonable amounts in the particular state for the operations listed. Such fees vary from state to state and in most cases represent an amount less than that received by the practitioner from private patients for identical services. Actually, most practitioners feel that to be realistic in relation to the fees charged private patients the amounts in the present schedule should be revised upward.

Your Committee has made a categorical statement reflecting adversely on physicians and dentists without, so far as I am able to ascertain, ever having called upon representatives of these professions to discuss the matter of fees with the Committee. Although there are presently in the House of Representatives two dentists and six physicians, it appears that this decision was made by a subcommittee consisting of six lawyers and one nonprofessional man.

The Association is not protesting because the Committee recommended reductions in the gross amount available for payment of physicians and dentists who render service in their own offices to Veterans' Administration beneficiaries.

It rests within the sound discretion of your Committee, and of the Congress, to determine how much of the taxpayer's money is to be made available for any purpose. Consequently, if it is the judgment of your Committee that it is necessary to reduce the quantity of home-

town medical and dental care now provided for veterans, your budgetary recommendations should reflect that decision. But the Committee should not, in its report, seek to escape political repercussions from veterans' organizations on account of reduced benefits, by unjustly, and without a shred of evidence, asserting that certain professional fees are too high and should be reduced, thus leaving the implication that the quantity of services will not be diminished, and at the same time casting an adverse reflection on the members of the health professions.

The March 1, 1952 price index, compiled by the Bureau of Labor Statistics, a federal agency, indicated that dental fees have risen only 62.8 per cent since 1935-39, while the general over-all cost of living has risen 88 per cent. Is this the sort of "fact" your Committee considered in determining that dental fees are too high? If not, what facts did you consider? Who presented them? Was any attempt made to obtain information about fees from the people who know most about them, the practicing dentists and their authorized representatives?

Should the Committee on Appropriations again have occasion to consider the costs of dental care in relation to appropriations, the American Dental Association would be extremely happy to furnish the Committee with up-to-date factual information on the subject. An inquiry addressed to its Secretary at Chicago, Illinois will be answered promptly and in as much detail as the Committee may desire.

So that the other members of the Appropriations Committee may be informed as to the views of the American Dental Association with regard to this report, copies of this letter are being sent directly to each one. Copies are also being furnished to the secretaries of each state dental society.

Very truly yours,
E. Harold Gale, D.D.S.
Chairman
Council on Legislation

Committee on Appropriations (House)

Clarence Cannon of Missouri, Chairman	(D)
John H. Kerr, North Carolina	(D)
George H. Mahon, Texas	(D)
Harry R. Sheppard, California	(D)
*Albert Thomas, Texas	(D)
Michael J. Kirwan, Ohio	(D)
W. F. Norrell, Arkansas	(D)
*Albert Gore, Tennessee	(D)
Jamie L. Whitten, Mississippi	(D)
*George W. Andrews, Alabama	(D)
John J. Rooney, New York	(D)
J. Vaughan Gary, Virginia	(D)
Joe B. Bates, Kentucky	(D)
John E. Fogarty, Rhode Island	(D)
Henry M. Jackson, Washington	(D)
Robert L. F. Sikes, Florida	(D)
Antonio M. Fernandez, New Mexico	(D)
William G. Stigler, Oklahoma	(D)
E. H. Hendrick, West Virginia	(D)
Prince H. Preston, Jr., Georgia	(D)
Otto E. Passman, Louisiana	(D)
Louis C. Rabaut, Michigan	(D)
Daniel J. Flood, Pennsylvania	(D)
Christopher C. McGrath, New York	(D)
*Sidney R. Yates, Illinois	(D)
Foster Furcolo, Massachusetts	(D)
Fred Marshall, Minnesota	(D)
Winfield K. Denton, Indiana	(D)
John J. Riley, South Carolina	(D)
Alfred D. Sieminski, New Jersey	(D)
John Taber, New York	(R)
Richard B. Wigglesworth, Massachusetts	(R)
Ben F. Jensen, Iowa	(R)
H. Carl Andersen, Minnesota	(R)
Walt Horan, Washington	(R)
Gordon Canfield, New Jersey	(R)
Ivor D. Fenton, Pennsylvania	(R)
Lowell Stockman, Oregon	(R)
*John Phillips, California	(R)
Errett P. Scrivner, Kansas	(R)
*Frederic R. Coudert, Jr., New York	(R)
Cliff Clevener, Ohio	(R)
Earl Wilson, Indiana	(R)
*Norris Cotton, New Hampshire	(R)
Glenn R. Davis, Wisconsin	(R)
Benjamin F. James, Pennsylvania	(R)
Gerald R. Ford, Jr., Michigan	(R)
Fred E. Busbey, Illinois	(R)
Fred G. Aandahl, North Dakota	(R)
Edward T. Miller, Maryland	(R)

*Members of subcommittee which prepared the report (Thomas, Chairman).

AUGUST 1952

LON W. MORREY, D.D.S., EDITOR
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THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

Scientific and social subjects vie for attention at the ninety-third annual session next month

St. Louis plays host to the nation's dentists next month as the Association holds its ninety-third annual session there September 8 to 11. The superior quality of the scientific program, the ideal convention facilities, the central location of the site and the nature of the legislative problems confronting the House of Delegates promise a record attendance.

For those who are primarily interested in the latest developments in research and operative technics the scientific program will furnish a concentrated refresher course unequalled elsewhere. The Council on Scientific Session has prepared a four-day program consisting of sixty-five scientific papers, two hundred table clinics, fifty scientific exhibits, one hundred and fifty technical exhibits, thirty motion pictures and three half-days of television demonstrations plus a combined meeting of all sections on Wednesday forenoon, September 10. This combined meeting, an innovation, will consist of two panel discussions: one evaluating the uses of antibiotics in dentistry and one evaluating the effect of oral focal infection.

Probably the most important legislative matter which will confront the House of Delegates concerns the attitude of the Association regarding the inclusion of dentists in the old age and survivors insurance program of the Social Security Act. Although this subject has been discussed by the House of Delegates for more than fifteen years and supposedly has been disposed of by the Association on at least two different occasions, it continues to bob up annually.

In 1948 the House directed the Council on Legislation to seek to have self-employed dentists included in OASI. In 1949 the House rescinded the 1948 action and directed the Council on Legislation to "seek amendments eliminating dentistry from any proposals to extend old age and survivors insurance to the self employed." In

1950 the House of Delegates directed the Council on Insurance to make another study of the subject. In the summer of 1951 that Council complied by conducting a nation-wide survey which revealed that members of the Association were about equally divided as to whether dentists should be included in OASI. In October 1951, at the ninety-second session of the Association, a full day's open meeting devoted to the subject disclosed a lamentable lack of understanding of the problem on the part of many members. In view of the results of the survey and the full day's open meeting the House of Delegates wisely decided to postpone further consideration of the subject until the ninety-third session in 1952. The House further recommended that constituent and component societies organize study groups for the purpose of "obtaining a full and clear understanding of the issues involved."

Most dental societies, during the intervening months, have endeavored to carry out the recommendations of last year's legislative body. Many societies have held special meetings, some have issued special bulletins and others have used their journals effectively to acquaint members with the merits and shortcomings of the OASI so that this year's delegates should be well informed, well instructed and capable of voting intelligently on the subject. Certainly an organization as large and representative as the American Dental Association must express itself unequivocally and soon on a matter which has such profound social significance as the inclusion of dentists in the OASI. It is hoped that a final and satisfactory decision will be reached next month thus ending the "off agin, on agin, gone agin, Finnagin" attitude which has prevailed in the past and which is unbecoming a professional organization.

American report on focal infection causes no alarm reaction abroad

In this issue of THE JOURNAL, John A. Kolmer presents focal infection as seen by a medical practitioner and student of preventive medicine. His account is in response to the special number of THE JOURNAL of June 1951, and in a measure complements the "Evaluation of the Effect of Dental Foci of Infection on Health" in that issue.

Interest in the 1951 report on the focal infection problem has been shared by members of the profession throughout the world. Although the echoes from the global impact are returning slowly, the reverberations, as recorded in foreign publications, merely repeat, for the most part, the tenor of the original article accented occasionally with approval or mild criticism.

The notice accorded the focal infection account in thirteen alien journals fairly reflects the international reaction. These periodicals represent India, Sweden, Switzerland, Western Germany, Colombia, France, Spain, Brazil, and Peru. With two or three exceptions, the foreign magazines have published extensive analyses of the article or have reprinted it almost completely in translation. There have been few comments, editors apparently assuming that a scientific profession is able to appraise a scientific report.

One German journal points out that "the critical and scientific sifting of all previously published works in English concerning the must controverted problem of focal

infection furnishes an outstanding groundwork for future research as well as for the therapeutic thinking of the dentist in his daily practice." Another calls attention to the fact that "the results of thousands of individual investigations" are incorporated. A third asserts: "The American study has supported this view with rich factual evidence. Anybody who makes contrary assertions assumes the obligation henceforth of analyzing this evidence and of producing equally clear proofs of his contentions."

Such criticism as is directed to THE JOURNAL report concerns mostly the omission of foreign literature from that reviewed. Specifically, failure to consider the neural pathology of the Russian Speransky as an alternative to the theory of the "alarm reaction" is cited.

Foreign comment reveals no consternation because American research has concluded, as one German journal states, that "focal infections from the teeth are not nearly so great a danger to the general health as has been supposed many times in the past." And there is no hysteria manifest such as that developed in some quarters in this country. One exception is a Colombian editor who is dismayed by the danger "of admitting to the public over night that the teeth and the oral cavity are things about which one need not be concerned."

Foreign journals, on the whole, have taken the aggregate American focal infection research in their stride. Satisfied to regard the problem of focal infection as a scientific question, most of them concur explicitly or tacitly in the conclusions of American investigators.

Don't be a "no show"

Hotel reservations reported by the housing bureau as THE JOURNAL goes to press indicate that the ninety-third annual session at St. Louis will attract the usual large registration. The annual session of the Association has grown so large that scarcely a half dozen cities can now accommodate it, and most of them must stretch their facilities to furnish adequate accommodations. Convention cities must guarantee the Association a minimum of 3,500 sleeping rooms which barely covers the needs of members. Each year the housing bureau functions so efficiently that few members having room reservations experience any confusion or disappointment on their arrival at the meeting.

Reserving a hotel room, however, for a heavily attended convention is not a one-sided responsibility. The guest as well as the host has certain obligations. All too frequently, when a change of plans prevents a person's registering at the hotel as agreed, he fails to notify the hotel or the housing bureau of his changed plans. This failure works a hardship on the hotel by tying up unused facilities and it also works a hardship on some other member by depriving him of much needed accommodations.

Prospective guests who fail to appear commonly are called "no shows." They may be called other names by harassed room clerks and hotel managers but that is irrelevant. The main point of this pointed paragraph is: don't be a "no show." If you must cancel your reservation do so immediately by writing or wiring the A.D.A. Housing Bureau, Room 406, 911 Locust Street, St. Louis. The housing bureau will notify your hotel of your change in plans.

Washington News Letter

Notwithstanding publication recently of a Congressional committee report that advises a "go slow" policy on fluoridation of communal water supplies, Washington officials believe that it will exert no influence on the adoption of this anti-caries measure. A significant point is that the National Capital itself inaugurated fluoridation in July, despite opposition by Rep. A. L. Miller (R., Neb.), a member of the House committee that filed the report. Congressman Miller not only served on the Delaney committee during its two-year investigation of chemical additives in foods, but also is an active member of the House committee that handles legislation affecting the voteless residents of the District of Columbia.

It was Congressman Miller, a physician, who took the lead in depreciating expert dental testimony and praising opposition witnesses when public hearings on fluoridation were conducted last spring by the seven-member special group headed by Rep. James J. Delaney (D., N.Y.). When the committee, at the close of Congress early in July, issued a report that withheld criticism of fluoridation supporters but asserted that further research was indicated to determine long-range physiologic effects, Congressman Miller decided to offer a supplemental report of his own that is less restrained.

He echoes the American Dental Association in his statement that fluoridation is a local question to be settled by the community. However, he suggests that a ballot referendum is the only legal method of adoption and asserts, "Where communities have had an opportunity to vote upon the question of adding fluorides to the drinking water, it is generally rejected."

Further Congressman Miller castigates the U. S. Public Health Service for having "gone beyond the scope of their duties, or what is expected of them by Congress and the people, in urging communities to adopt the universal fluoridation of water without knowing the results of experiments that are now in progress." He characterizes as "propaganda" the efforts made by the USPHS to encourage municipalities to introduce fluoridation, even though such efforts were launched only after the measure's efficacy had been scientifically established and research had failed to disclose any proof that it is dangerous.

VETERANS ADMINISTRATION FUNDS

The Veterans Administration annual budget for 1952-53, which was passed by Congress shortly before adjournment and subsequently was signed by President Truman, discloses the prospect of a sharp cutback in the so-called home town dental care program. During the past five years, private dentists throughout the country have received $172,000,000 in fees for examinations and treatment of VA beneficiaries—an average of almost $35,000,000 annually. But for the current fiscal year, which ends July 1, 1953, only $23,500,000 can be allocated for this purpose, despite the fact that the outpatient load is growing steadily.

Bion R. East, assistant chief medical director of VA in charge of dental services, estimates that it would require approximately $40,000,000 to accommodate all eligible cases in 1952-53 and to liquidate the backlog. This sum, he emphasized, makes no allowance for any fee schedule increases.

In that regard, Joel T. Boone, chief medical director, testified as follows before a Senate appropriations subcommittee that handled the VA budget:

"In the official report of the House committee, there is a criticism that the Veterans Administration overpays physicians and dentists in the home town care program. These fees are based on contracts made annually with physicians and dentists through state societies for the most part.

"The VA fee schedule was established in 1946 with a slight modification medicalwise—but not dentalwise—in 1949. In other words, the fees are based on prevailing rates as existent in 1946. The 1946 and 1952 dollars are obviously in wide variance. My office . . . is in receipt of not only requests by State societies for an increase for medical, dental and pharmaceutical fee schedules, but protests against prevailing VA fee schedules. One community has declined to renew its contract pertaining to dental service because no upward revision has been made in the fee schedule.

"It is timely to inform the committee that the home town care program is very big business. In the home town care program there are approximately 100,000 physicians, 65,000 dentists and 35,000 druggists partici-

pating. Almost every community in the United States is involved in this program."

Reduction of the Veterans Administration's operating appropriation does not rule out the possibility that fee schedules may be increased, at least in certain areas, within the next few months. Should such action be taken, however, it would reduce by that much the number of cases that could be certified for payment, since there is a ceiling on the money available. On the other hand, Congress may grant a supplemental appropriation after it convenes in January.

Dr. East has pointed out that, on the bright side, the new budget will permit continued development of the dental service's research and education programs on a modest scale.

PANEL ON DENTISTRY

Problems in dentistry, ranging from financial support of training and geographical distribution of the profession's members to feasibility of providing services through voluntary prepayment systems, were subjected to spirited discussion by an expert panel on July 15. The program was the latest in a series sponsored by the President's Commission on the Health Needs of the Nation.

Topics on the agenda included: availability of dental manpower in relation to demand; adequacy of training facilities; present and anticipated requirements for dental specialists, general practitioners and public health dentists; groups practice, and fees.

Chairman of the panel discussion was Lester C. Burket, whom President Truman recently named to the Commission to fill the vacancy caused by the death of Ernest G. Sloman.

Scheduled participants included Shailer Peterson and B. Duane Moen, for the American Dental Association; John C. Brauer, Russell A. Dixon, Willard C. Fleming, Maynard K. Hine and Harry Lyons, all deans of dental schools; Philip E. Blackerby, president of the American Association of Public Health Dentists; Wendell L. Wylie, University of California dental school professor, and Melvin Dollar, executive director of the Group Health Association, Washington, D. C.

HEALTH RESOURCES REPORT

August 11 is the scheduled publication date of *Health Resources in the United States*, a 352-page compendium prepared by the Brookings Institute, Washington, D. C. Its chapters include statistical data on dental personnel and their distribution, the extent of fluoridation and health services in industry.

International Correspondence

NEWS FROM FINLAND

The Finnish Dental Society celebrated its sixtieth anniversary on April 15-16, 1952. This Society was founded by a group of dentists led by the late Matti Äyräpää, who became known as the "Father of Finnish Dentistry." From a very modest beginning the organization expanded to a society of more than 1,300 members, including practically all dentists in the country. The function of the Finnish Dental Society is the advancement of dentistry and the fostering of the feeling of solidarity among its members. The management of economic affairs is taken care of by another society.

Participation in the Sixtieth Anniversary Festival Congress was a valuable experience for Finnish dentists. Many of them were able to attend the lectures of eminent European and American scientists.

The first lecture was presented by M. Dechaume from Paris, on the local treatment of dental caries, pulpitis and apical granuloma by ozone. A well-known authority from Germany, M. Wassmund, lectured on the surgery of the temporomandibular joint, and Professor P. O. Pedersen of Copenhagen gave an account of his studies on the structure of the enamel surface using the replica method.

H. H. Stones of Liverpool reported a survey of the symptoms of hypovitaminoses and blood dyscrasias in the mouth. A. J. Held of Geneva lectured on the functional therapy of periodontal diseases, and H. Beyron of Stockholm described occlusal changes in adult dentition. D. B. Scott of Bethesda, Md., gave a very interesting and illuminating account of his electromicroscopic studies on the structure of the enamel and dentin. G. Lindblom of Stockholm gave a report on recent studies dealing with the movements of the condyle, clarifying his presentation by means of a roentgenographic motion picture.

Finnish odontologists lecturing at the congress were Yrjö V. Paatero, who lectured on his pantomographic roentgenography, and B. Ekensten, who described the results of his preliminary studies on the movements of the temporomandibular joint, carried out by means of the electroaudiographic method.

It is to be regretted that Ch. F. L. Nord of Amsterdam and E. Reichenbach of Halle (Eastern Germany) were not able to accept the invitation to attend and lecture at the congress. M. Dazenko of Kharkov, USSR, being delayed by difficulties of communication, arrived in Helsinki after the congress was concluded, but gave some lectures then, including one on the use of fluorides in preventive dentistry in the Soviet Union.

A significant number of grants was awarded to Finnish dental scientists at the festival meeting. At the moment the pursuit of odontology in Finland has reached new heights, although there are considerable economic difficulties and no one can devote himself entirely to research work. Most of the dental research is carried out at the Institute of Dentistry, University of Helsinki, by its faculty members, but private dentists are doing valuable research work also. The dean of the Institute of Dentistry is Professor Eero Tammisalo, who is also the head of the prosthetic department. Professor Juuso Kivimäki, head of the oral surgery department, is also president of the Finnish Dental Society, and having had both of these posts for a good many years, he has been able to lead Finnish odontology from its modest status of two decades ago to its present active stage. He is to be given the highest credit for the success of the anniversary congress, too.

In connection with the congress several dental scientists from all over Europe were invited to become honorary and corresponding members of the Finnish Dental Society. Bonds were also established with dentistry of the United States by electing H. Trendley Dean of Washington, D. C., an honorary member and Harold Hillenbrand of Chicago, Howard M. Marjerison of Boston, and David B. Scott of Bethesda, Md., corresponding members.

Kalevi Koski, Helsinki

HOUSE OF DELEGATES' DECISION ON OASI TO HEADLINE ASSOCIATION'S 93rd ANNUAL MEETING

The House of Delegates at the 93rd annual session of the American Dental Association, meeting September 8-11 in St. Louis, will make decisions affecting both the dental profession and the public which dentistry serves. On the agenda is the question of whether to approve the inclusion of dentists in Social Security provisions. In 1949, the House of Delegates voted to oppose such inclusion. In 1951, when the question was again introduced, the delegates voted to defer action on it with the suggestion that constituent and component societies study the question and instruct their delegates on the vote this year.

STASSEN, GUEST SPEAKER

Guest speaker at the general session of the 93rd annual meeting will be Harold E. Stassen, president of the University of Pennsylvania and former governor of the state of Minnesota.

STATE SOCIETY OFFICERS

The annual conference of State Society Officers will be held from 9 A.M. until 5:30 P.M. Sunday, September 7 in the Crystal Room of the Hotel Jefferson.

Subjects to be discussed at the conference include: arousing community interest in dental health programs, using films in health education, financing operation of a state society and instituting post payment plans for component societies. During the luncheon in the Ivory Room, the conference will be addressed by Otto W. Brandhorst, president-elect of the American Dental Association.

Officers of the organization are John B. Benediktson of Oakland, Calif., president; Earle S. Arnold of West Hartford, Conn., vice-president; and Harry Wilson of Des Moines, Iowa, secretary.

DENTAL HEALTH CONFERENCE

All individuals who plan to attend the annual session have been invited to attend the third annual dental health conference to be held September 6 by the Council on Dental Health. State dental directors, members of constituent society councils on dental health and other interested persons will meet with members of the Council in an all-day session at the Jefferson Hotel, to discuss new developments in public health dentistry.

ELECTION OF TRUSTEES

Trustees will be elected for the Seventh, Tenth, First and Sixth Districts, to replace the following trustees, whose terms expire this year: J. B. Carr of Indianapolis; C. S. Foster of Cedar Rapids, Iowa; Charles I. Taggert of Burlington, Vt., and Robert P. Thomas of Louisville, Ky.

HOTEL ACCOMMODATIONS

As preparations for the 93rd annual meeting progress, requests for reservations have poured into the Housing Bureau in St. Louis. Excellent accommodations in 25 St. Louis hotels may still be obtained by using the convenient application form on page A-21 of this issue. However, as record attendance is expected at this meeting, dentists who have reserved hotel accommodations and who will not

The Jefferson Memorial in Forest Park is one of the well-known monuments of St. Louis, the site of the 93rd annual session of the American Dental Association. Scientific meetings will be held September 8-11 in the Kiel Auditorium. The Jefferson and the Statler have been designated official hotels for the convention.

be able to use them, are asked to advise the Housing Bureau of their cancellations promptly; the accommodations may then be released for others.

COLOR TELEVISION CLINICS

A complete program of color television clinics will be presented during the morning and afternoon of the opening day, September 8, and the morning of September 9, it has been announced by William S. Brandhorst, chairman of the subcommittee on television clinics.

The clinics will originate in a model dental office on the fourth floor of Kiel Auditorium; they will be viewed on 10 large receiving sets in the convention hall on the second floor of the Auditorium. Microphones will be available to the audience to facilitate questions from viewers.

One of the outstanding clinic programs will concern leukoplakia. Patient presentation will be followed by a panel discussion by Joseph L. Bernier of Washington, D.C.; H.B.G. Robinson of Columbus, Ohio; Lester R. Cahn of New York; W. N. Burford of Columbia, Mo.; and Edward F. Allen of St. Louis. Dr. Burford will also demonstrate biopsy technic.

FILMS, ESSAYS, CLINICS

A continuous showing of the latest scientific films will feature presentations on complicated exodontics, intravenous anesthesia, bone graft and plating of the mandible and other subjects.

The films selected for showing at the meeting have been produced by federal agencies, universities, health organizations and private individuals.

In addition, the 11 scientific sections will present 60 essayists; the combined session of all sections will feature eminent dental scientists in discussions of focal infection and the use of antibiotics in dentistry. A total of 200 table clinics, 50 scientific exhibits and 205 technical exhibits will also be presented.

A.D.A. DELEGATION ATTENDS INTERNATIONAL CONGRESS

A delegation of 22 dental leaders represented the American Dental Association at the Eleventh International Dental

Congress in London, July 19-26. The 22 delegates were:

John R. Abel of Beverly Hills, Calif.
Philip E. Adams of Boston
William R. Alstadt of Little Rock, Ark.
Don J. F. Aubertine of San Francisco
Adm. Alfred W. Chandler of Washington, D.C.
Bruce D. Forsyth of Boston
Howard B. Higgins of Spartanburg, S. C.
Herbert J. Hoppe of Cleveland
R. Fred Hunt of Rocky Mount, N. C.
Andrew F. Jackson of Philadelphia
Col. Marvin E. Kennebeck of Washington, D.C.
John W. Knutson of Washington, D.C.
Frank Lamons of Atlanta, Ga.
Harry A. Mesjian of Philadelphia
Walter J. Monia of Beverly Hills, Calif.
Roger L. Offen of Stamford, Conn.
Brig. Gen. Oscar P. Snyder of Washington, D.C.
William Ward Tracy of New York
Stanley D. Tylman of Chicago
Luis Coll Watlington of Santurce, Puerto Rico
Harry K. Willits of Reading, Pa.
Neal L. Zimmerman of Portland, Ore.

The Association's five representatives to the executive council of the Fédération Dentaire Internationale also attended the Congress. They are: LeRoy M. Ennis of Philadelphia; Harold Hillenbrand of Chicago; Daniel Lynch of Washington, D.C.; Obed Moen of Watertown, Wis., and Oren Oliver of Nashville, Tenn.

DENTAL APTITUDE TESTING DISCUSSED AT LONDON MEETING

The Association's dental aptitude testing program was explained to dental educators from all over the world at a special meeting held during the recent International Dental Congress in London.

Shailer Peterson, secretary of the Council on Dental Education, spoke July 24 in the lecture theatre of London's Royal Dental Hospital, to dental leaders who had requested information on the aptitude testing program. The meeting was arranged by H. M. Pickard of London, secretary of the International Dental Congress.

LEROY M. ENNIS RECEIVES NEW HONOR IN BRITAIN

Word has just been received that LeRoy M. Ennis, president of the Association, has been made a Fellow in Dental Surgery of the Royal College of Surgeons of England. The fellowship was bestowed on Dr. Ennis July 18 while he was in London attending the Eleventh International Dental Congress as a representative of the American Dental Association to the executive council of the Fédération Dentaire Internationale.

IRISH UNIVERSITY HONORS ASSOCIATION SECRETARY

The degree of Honorary Master of Dental Surgery was awarded July 8 to Harold Hillenbrand, secretary of the Association, by the National University of Ireland in Dublin. Eamon De Valera, Prime Minister of Ireland, conferred the degree in ceremonies which were attended by LeRoy M. Ennis, president of the Association, and others.

Dr. Hillenbrand was presented in an address which praised the "great traditions of American dentistry."

RESEARCH ASSOCIATE JOINS ASSOCIATION'S N.B.S. STAFF

A new research associate has been appointed to the American Dental Association staff at the National Bureau of Standards. He is John W. Stanford, who

J. W. Stanford

was graduated cum laude in chemistry this June by the University of Maryland.

Mr. Stanford recently was awarded a medal by the Washington, D.C. section of the American Institute of Chemists in recognition of his attaining the highest scholastic record among graduating seniors who had majored in chemistry at the University of Maryland.

During the summer of 1951, he served as a technical assistant in the Dental Research Section of the National Bureau of Standards. As a result of this experience, he is co-author of a research report on the properties of self-curing denture resins [J.A.D.A. 44:295 (March) 1952].

COMMITTEE TO REPORT DENTAL OFFICERS' RELEASE

Constituent societies of the Association are now being informed of the release from service of Army and Air Force dental officers in their area. The new service was inaugurated in July by the Association's Special Committee on National Emergency Dental Service, through the cooperation of the Army and Air Force.

Francis J. Garvey, secretary of the Special Committee, announced that the two services will provide periodically each officer's name, home address and date of release. This information, together with the officer's membership status in the Association, will be forwarded by the Committee to the constituent society secretary in his area.

Mr. Garvey noted that negotiations for similar service from the Navy are now pending.

NEWLY-ACQUIRED FILMS FOR DENTAL GROUPS LISTED

The following 16 mm. films are now in circulation and may be rented from the Bureau of Library and Indexing Service:

"Dental Assistants—Their Effective Utilization." A 20-minute color and sound film produced by the U.S. Public Health Service.

"Fluoridation." A five-minute color and sound film explaining the Grand Rapids, Michigan, experience with fluoridation.

"The Fluoridation Story." A 3½-minute, color or black-and-white sound film produced by the U.S. Public Health Service, stressing the economy and simplicity of fluoridation and the results obtained.

"Denture Resin." An 18-minute color and sound film showing physical characteristics and chemical conduct of acrylic resins.

"Casting of Dental Gold Alloys: Thermal Expansion Technique." An 18½-minute color and sound film showing demonstrations of casting.

The last two films are suitable for use before professional audiences only. The others may be used for both general audiences and professional groups.

COUNCIL CONDUCTS SURVEY ON PROGRESS OF FLUORIDATION

A survey of the progress of fluoridation in the United States is now being conducted by the Council on Dental Health, through the cooperation of all state health departments. The Council has sent to these departments a questionnaire asking information on communities which have adopted fluoridation as of July 1, 1952.

The survey will show the number of communities where fluoridation is in operation, where fluoridation has been officially approved but not started, and where unfavorable action has been taken in regard to fluoridation. The survey will also report the dates of operation, method of approval, financing, population affected and yearly per capita cost.

The questionnaire does not apply to natural fluoride areas, which will be the subject of an early survey by the Association's Bureau of Economic Research and Statistics.

RELIEF FUND CONTRIBUTIONS SET RECORD AT $94,199.56

Contributions to the Association's recent 1951-52 Relief Fund drive totaled $94,199.56, the highest amount recorded since the Fund campaign was established. During this year's drive, 32 societies contributed more than their goals, which also established a record. The drive ended July 1.

The following are the contributions of constituent societies:

	Quotas	Contributions	Pct.
Affiliate	$	$ 4.00	....
Air Force	460.00	494.75	107.5
Alabama	740.00	1,616.00	218.3
Alaska	40.00	80.00	200.0
Arizona	260.00	500.00	192.3
Arkansas	480.00	484.50	100.9
Army	480.00	356.50	74.3
Associate	.....	5.00	....
California	3,540.00	3,234.00	91.3
California, So.	4,340.00	9,625.50	221.7
Colorado	940.00	1,001.50	106.4
Connecticut	1,910.00	1,719.50	90.0
Delaware	150.00	155.00	103.3
Dist. of Col.	840.00	1,304.50	155.3
Florida	1,180.00	1,155.50	97.9
Georgia	1,020.00	1,170.40	115.1
Hawaii	350.00	382.00	109.1
Idaho	260.00	269.00	103.5
Illinois	7,750.00	6,976.00	90.0
Indiana	2,280.00	2,383.50	104.5
Iowa	1,900.00	1,581.06	83.2
Kansas	1,060.00	837.30	79.0
Kentucky	1,060.00	1,100.00	103.8
Louisiana	1,010.00	766.25	75.9
Maine	450.00	348.50	77.4
Maryland	1,010.00	1,068.00	105.7
Massachusetts	3,780.00	3,820.90	101.3
Michigan	3,900.00	3,340.65	85.6
Minnesota	2,970.00	2,628.35	88.4
Mississippi	530.00	531.34	100.3
Missouri	2,550.00	2,109.85	82.7
Montana	360.00	399.15	110.9
Navy	850.00	426.50	50.2
Nebraska	1,100.00	1,121.68	102.0
Nevada	90.00	79.50	88.3
New Hampshire	300.00	316.00	105.3
New Jersey	4,110.00	4,250.25	103.4
New Mexico	200.00	206.50	103.3
New York	15,620.00	10,756.50	68.8
North Carolina	1,250.00	1,345.00	107.6
North Dakota	330.00	499.00	151.2
Ohio	4,940.00	4,151.90	84.0
Oklahoma	880.00	1,154.00	131.1
Oregon	1,170.00	1,271.50	108.7
Panama C.Z.	20.00	24.00	120.0
Pennsylvania	7,190.00	5,179.08	72.0
Pub. Health S.	240.00	133.50	55.6
Puerto Rico	280.00	87.00	31.1
Rhode Island	550.00	480.00	87.3
So. Carolina	430.00	253.50	59.0
South Dakota	340.00	223.00	65.6
Tennessee	1,110.00	1,517.25	136.7
Texas	3,010.00	2,029.60	67.4
Unorganized	.....	11.00	....
Utah	480.00	741.00	154.3
Vermont	190.00	125.00	65.8
Vet. Admin.	990.00	388.00	39.2
Virginia	1,120.00	903.50	80.6
Washington	1,690.00	1,942.50	114.9
West Virginia	770.00	847.00	110.0
Wisconsin	2,990.00	2,095.80	70.1
Wyoming	160.00	175.00	109.4
Anonymous	.....	4.00	....
Senior Student	.....	3.00	....
Total	$100,000.00	$ 94,199.56	94.2

Legislation

REGULATIONS ON APPEALING DRAFT CLASSIFICATION NOTED

Dentists classified as special registrants under present Selective Service regulations have the same right of appeal as do general registrants, it was announced recently by F. J. Garvey, executive secretary of the Special Committee on National Emergency Dental Service.

In a memorandum to secretaries of constituent societies and deans of dental schools, Mr. Garvey pointed out that a draft classification may be appealed to a state appeal board by the registrant, his dependents and any person who requested the occupational deferment of the registrant prior to his classification.

Although an appeal may not be made from priority determination, a registrant

may question his priority at the time he appeals his draft classification. A registrant classified I-A, I-AO or I-O may also appeal the state board's decision to the President of the United States if one or more members of the appeal board dissented from his classification.

LAW EXTENDS EQUALIZATION PAY TO DENTAL OFFICERS

On June 25 the President signed bill S 3019, which extends the provision for $100 monthly additional pay to dental and medical officers who enter the service before July 1, 1953. The bill is now known as Public Law 410, 82nd Congress.

The bill also transfers authority for reservists' special pay from Public Law 779 to section 203 of the Career Compensation Act. Under the former authorization, medical and dental reservists would have been eligible to receive this pay whenever they were called to active duty. Under the present law, they will not receive the equalization pay if they are ordered to active duty after July 1, 1953.

The President also signed bill S 2552, also sponsored by Sen. Lester C. Hunt (D., Wyo.), which enables the armed services to commission women physicians and dentists on the same basis as men.

Dental Societies

PROPOSE ADVERTISING BUREAU FOR STATE JOURNALS

Proposals for forming a national advertising bureau to represent all state society dental journals will be investigated by the Council on Journalism, it was announced after the Conference on Dental Journalism recently held at the Central Office.

The 35 members of the conference asked the Council to study the advisability of forming a bureau similar to that of the American Medical Association, which assists state journals to obtain national advertising. The conference set no time limit on the study, but directed the Council to make recommendations on its findings to the Association's Board of Trustees.

Earlier, the Conference had heard the director of the A.M.A. bureau report that last year the bureau had handled $600,000 in national advertising for its state journals.

Shown at the recent meeting of the Illinois State Dental Society are (l. to r., seated) H. W. Stonebrook of Eldora, Iowa, and Floyd Pillars of Des Moines, respectively president-elect and president of the Iowa State Dental Society; Harold Hillenbrand of Chicago, secretary of the American Dental Association, and L. H. Jacob of Peoria, Trustee from the Eighth District. Standing (l. to r.) are J. E. Mahoney of Wood River, Ill., and M. E. Zinser of Chicago, respectively president-elect and president of the Illinois Society.

The two-day conference, sponsored by the American Association of Dental Editors and the Association's Council on Journalism, also featured discussions of regional journals, layout design and advertising policy.

NEW HAMPSHIRE DENTISTS OBSERVE SOCIETY'S 75th YEAR

The Diamond Jubilee meeting of the New Hampshire Dental Society heard Otto W. Brandhorst, president-elect of the American Dental Association, speak on "Some Problems Facing the Profession." The meeting at Bretton Woods, N. H., extended from June 29 to July 1 and included five general scientific meetings as well as table clinics, a business meeting and the anniversary banquet at which Dr. Brandhorst spoke.

CHICAGO DENTAL SOCIETY OPENS ESSAY COMPETITION

The Chicago Dental Society has opened its twelfth annual competition for essays which "represent original investigations and contain some new, significant material of value to dentistry."

A $500 award will be presented to the author of the prize-winning essay, and he will be invited to present his paper at the 1953 Midwinter Meeting of the Chicago Dental Society next February, the Society has announced. Contestants should be members of the American Dental Association or of a recognized dental institution.

Application forms may be obtained from the Chicago Dental Society, 30 North Michigan Avenue, Chicago 2. The completed forms must be filed with the Society before September 1, 1952.

Dental Education

NEEDS IN DENTAL EDUCATION DISCUSSED BY PANEL

Available educational facilities and faculties were viewed in relation to the dental health requirements of the country during the July 15 panel discussion on dental education sponsored by the President's Commission on the Health Needs of the Nation.

Six dental educators, as well as representatives of the American Dental Association and the American Association of Public Health Dentists, met in Washington, D. C., to discuss school finances, manpower problems, selection of students and faculties, graduate studies and the education of specialists.

Lester W. Burket, dean of the School of Dentistry, University of Pennsylvania, presided over the session as a member of the President's Commission. Dr. Burket was appointed earlier to represent the dental profession on the 15-member Commission, replacing the late Ernest G. Sloman.

Keynote speaker of the panel was John C. Brauer, dean of the School of Dentistry, University of North Carolina. The two representatives of the American Dental Association were Shailer Peterson, secretary of the Council on Dental Education, and B. Duane Moen, director of the Bureau of Economic Research and Statistics.

Other participants in the panel discussion were: Philip E. Blackerby, Jr., director of the Division of Dentistry, W. K. Kellogg Foundation; Russell A. Dixon, dean of the Howard University dental school; Melvin Dollar, executive director of the Group Health Association; Willard C. Fleming, dean of the University of California dental school; Maynard Hine, dean of the Indiana University dental school; Harry Lyons, dean

of the dental school at the Medical College of Virginia, and Wendell L. Wylie, professor of orthodontics and chairman of the division of dental hygiene at the University of California dental school.

ROBINSON ASSOCIATE DEAN AT OHIO STATE DENTAL SCHOOL

Hamilton B. G. Robinson of Columbus has been appointed associate dean of the Ohio State University College of Dentistry, it was announced recently by Wendell D. Postle, dean. Dr. Robinson, a graduate of the University of Pennsylvania dental school, has been director of the postgraduate division of the Ohio State University College of Dentistry. Well-known for his research, he is editor of the *Journal of Dental Research* and has served as the editor of several other publications.

PAUL E. BOYLE NAMED TO CANCER SOCIETY COMMITTEE

Paul E. Boyle of Philadelphia, professor of oral pathology at the University of Pennsylvania dental school, has been selected to serve on the professional education subcommittee of the American Cancer Society, Inc. A member of the American Dental Association's Council on Dental Museum and Registry, Dr. Boyle is the only dental representative on the national advisory subcommittee of the American Cancer Society. He recently assisted the Society in planning its film on oral cancer.

E. W. WILLETT TO HEAD DEPARTMENT AT EMORY

Capt. E. W. Willett, DC, USN (Ret.) has been appointed professor and chairman of the department of operative dentistry at the Emory University School of Dentistry, according to an announcement from John E. Buhler, dean.

Captain Willett retired from the Navy Dental Corps July 1 after 25 years of continuous service. His appointment to the University staff became effective July 15.

Also appointed to the faculty at Emory are Joe Minor of Nashville, Tenn., and M. M. Ash, Jr., of East Lansing, Mich. Dr. Minor has been appointed associate professor of operative dentistry and Dr. Ash, instructor in oral pathology.

COLUMBIA UNIVERSITY NAMES COUNCIL ON MEDICAL AFFAIRS

Maurice J. Hickey, head of the School of Dental and Oral Surgery, Columbia University, has been appointed to the University's new "Council on Medical Affairs." The Council, which will be composed of 30 representatives of business and professional groups, has been established to advise the University on "the discharge of its public responsibilities and in the development of its medical program."

DENTAL SCHOOLS SCHEDULE POSTGRADUATE COURSES

College of Physicians and Surgeons • A total of 29 refresher courses in nine subjects will be offered during the 1952-53 school year by the College of Physicians and Surgeons, San Francisco.

Tooth Guidance, a five-day course will be presented by the orthodontics staff at four times: September 22-26, November 10-14, January 19-23 and May 18-22.

Dentistry for Children, an eight-day course, will be offered by the pedodontics department at eight times: September 29-October 8, October 27-November 5, December 1-10, January 5-14, March 2-11, March 30-April 8, May 4-13 and June 1-10.

Airbrasive Technic, to be offered seven consecutive days, is scheduled October 13-19, February 2-8 and June 22-28.

Cavity Preparation and Precision Casting will be presented September 15-19, March 16-20 and July 15-19 by the prosthetic den-

tistry department. Endodontics, a three-day course, will be presented April 13-15 only.

Local Anesthesia and Preoperative-Postoperative Medication will be taught December 11-12 and May 14-15; Practice Administration, February 26-27 and April 16-17.

Full Denture Prosthetics, a five-day refresher, is scheduled December 15-19, February 16-20 and April 27-May 1. Periodontics will be offered October 20-24, January 26-30 and May 25-29.

All courses are conducted in morning and afternoon sessions, eight to nine hours a day. Class enrollments are limited. A brochure describing each course in detail may be obtained from the director of postgraduate dental education, College of Physicians and Surgeons, 344 Fourteenth Street, San Francisco 3. An application form is included.

Illinois • An 11-month postgraduate and graduate course in periodontal diseases will be presented during the coming year by Robert G. Kesel and the staff of the department of applied materia medica and therapeutics of the University of Illinois College of Dentistry.

The course is designed for dentists interested in preparing for specialization in the field of periodontology or in pursuing studies leading to a master of science degree in this field. It will include instruction in clinical periodontics, histophysiology and pathology of the periodontal tissues, the management of patients with systemic diseases, applied pharmacology and oral bacteriology. The course begins September 25.

Additional information may be obtained from the department of applied materia medica and therapeutics. University of Illinois College of Dentistry, 808 South Wood, Chicago 12.

Michigan • The University of Michigan's W. K. Kellogg Foundation Institute for Graduate and Postgraduate Dentistry will offer a series of one-week, two-week and one-day-a-week courses during the 1952-53 school year.

Two-week courses to be given this fall include: complete denture prosthesis, R. H. Kingery and others, September 29-October 10; crown and bridge prosthesis, F. B. Vedder and others, October 13-24; dentistry for children, K. A. Easlick and others, December 1-12; endodontics, R. F. Sommer and others, December 1-12; minor oral surgery, P. M. Northrop and others, November 3-14; operative dentistry, L. C. Schultz and others, September 29-October 10; partial denture prosthesis, O. C. Appelgate and staff, October 13-24; periodontics, D. A. Kerr and others, December 8-19.

Airbrasive technic, a one-week course, will be presented October 13-17 by William R. Mann and staff.

One-day-a-week courses scheduled for this term include: complete denture prosthesis by R. H. Kingery and others on Tuesday, beginning October 14; crown and bridge prosthesis by F. B. Vedder and others on Thursdays, starting October 2; endodontics by R. F. Sommer on Thursdays, starting October 2.

Further information on these and other courses may be obtained by writing to William R. Mann, associate director of the W. K. Kellogg Foundation Institute: Graduate and Postgraduate Dentistry, University of Michigan, Ann Arbor, Mich.

Ohio State • Five-day courses, to be conducted Mondays through Fridays, will be presented by the Ohio State University College of Dentistry during the coming semester. The courses are:

Anatomy of Head and Neck, September 22-26 by Linden F. Edwards;
Clinical Oral Pathology and Diagnosis, October 13-17 by H. B. G. Robinson;
Periodontics, October 20-24 by John R. Wilson;
Full Denture Prosthesis, October 20-24 by Carl O. Boucher;
Partial Denture Prosthesis, October 27-31 by Victor L. Steffel;
Oral Surgery, October 27-31 by D. P. Snyder;
General Anesthesia, November 17-21 by Morgan L. Allison;
Airbrasive Technic, October 6-10, November 3-7 and November 17-21, by John N. Bowers.

Enrollment is limited to approximately 10 per class. Further information and application forms may be obtained from

the Postgraduate Division, College of Dentistry, Ohio State University, Columbus 10, Ohio.

Toronto • Three postgraduate courses will be offered by the University of Toronto, Faculty of Dentistry, during the next few months.

Anatomy as Applied to Dentistry will be taught by J. C. Watt, September 15-17, to a limited enrollment of 6 students.

Dental Oral Surgery and Anesthesia will be reviewed November 17-21 by a staff of lecturers and clinicians under the direction of J. H. Johnson. Enrollment will be limited to 12.

Pedodontics will be presented November 24-26 by S. A. MacGregor and G. Nikiforuk. Registration is limited to 12.

Registration forms and detailed information on the courses may be obtained by writing to the dean of the Faculty of Dentistry, University of Toronto, 230 College Street, Toronto 2-B, Ontario, Canada.

Tufts • A special participation course in occlusal rehabilitation will be presented during the coming year by the division of graduate and postgraduate studies of Tufts College Dental School. Louis A. Cohn of New York will conduct the course, which will consist of lectures, clinical demonstrations and practice in the science and art of occlusal rehabilitation.

The class will meet every other week on Friday and Saturday, 9 A.M.-5 P.M., from October to April. Further information and application forms may be obtained from the director of postgraduate studies, Tufts College Dental School, Boston.

SAN SALVADOR SCHOOL SEEKS SPANISH-SPEAKING TEACHER

The National University of El Salvador, San Salvador, is interested in engaging a visiting professor in crown and bridge technic for the current school term, which ends in December. The professor would be required to speak Spanish fluently. He would teach 18 hours a week, which would include 6 hours of theory and 12 hours of clinic instruction.

The University offers $700 a month and round-trip passage for the professor and his family. Further information may be obtained from Carlos Recinos Cea, dean of the dental school, National University of El Salvador, San Salvador.

International

FIRST LATIN-AMERICAN CITY TO BEGIN FLUORIDATION

San José, the capital of Costa Rica, will begin the fluoridation of its water supply in the near future, it has been announced by the Institute of Inter-American Affairs. San José, which has a population of about 80,000 is believed to be the first Latin American city to install a water fluoridation system.

The Institute of Inter-American Affairs, representing the United States, signed an agreement with Costa Rica on June 19 to cooperate in the installation of the system. The project will cost about $2,675, according to the Institute; of this sum, San José and the Costa Rican Ministry of Public Health will contribute 70 per cent. The U. S. Public Health Service, which is the operating unit in the Costa Rican Point 4 program, will contribute the remainder of the estimated cost through its operating fund provided by the Costa Rican government and the Institute. The U. S. Public Health Service will also supervise the purchase and installation of all equip-

ment and will train the operating personnel.

At the present time, a survey of San José children's teeth is being conducted by the department of dental hygiene of Costa Rica's Ministry of Public Health. This survey will be used as a basis for future studies on the effect of fluoridation.

CHILEAN DENTAL ASSOCIATION ELECTS 1952-53 OFFICERS

Raúl Muñoz Inza of Santiago, Chile, recently was elected to the presidency of the Colegio de Dentistas de Chile. Other officers for 1952-53 are: Ernesto Rocco, vice-president; Ismael Carmona, secretary, and Juan Castellon, treasurer.

Eduardo Ferraro

Eduardo Ferraro was the official delegate of the Colegio de Dentistas de Chile to the Eleventh International Dental Congress in London. Dr. Ferraro was accompanied by Alfonso Leng and Mateo Papic.

ISRAEL DENTAL ASSOCIATION HOLDS NATIONAL MEETING

The Israel Dental Association has convened in Tel Aviv for its first national meeting. Scientific sessions are being conducted August 1-4, according to an announcement from the organization's central committee. A. Sussman and M. Weinreb, members of the committee, state that many eminent dental authorities are to lecture at the meeting.

A 1953 dental mission to Israel contemplated by the Unitarian Service Committee is now being organized by Isaac Schour of Chicago, it was recently announced. Dr. Schour is in Israel to investigate facilities and to lay plans for the mission, on assigment from the Committee.

DENTAL HEALTH MAGAZINE FOR LAYMEN ISSUED IN INDIA

M. K. Patel of Bombay, past president of the All India Dental Association, is the editor of a new quarterly journal on health for the lay public in India. The publication, *Teeth and Health*, is described as "an educational magazine for healthy living."

Articles on children's dentistry, toothbrushing, periodontal disease and nutrition are contained in the first issue, as well as features on other health problems. The magazine is published by the Dental Publishing Company, 121 Esplanade Road, Bombay 1, India.

CLINIC IN KOREA OFFERS DENTAL TREATMENT, MOVIES

Men of the 40th Infantry Division in Korea may now look forward to visiting their divisional dental clinic—an experience reserved only for those whose teeth require more extensive care than their regimental dentist is equipped to give.

The new 40th Division dental center near the front lines offers movies, letter-writing facilities and recreation as well as dental treatment in a clinic staffed by 8 dentists and 20 technicians.

Maj. Richard H. Friedman of Pacific Palisades, Calif. is the divisional dental surgeon who recently set up the clinic. "When a man's teeth are in bad condition," Major Friedman explains, "he is sent down from the regimental dentist

with his sleeping bag and mess equipment. He remains here until his teeth are completely repaired." The clinic is handling about 50 patients each day.

BRAZILIAN DENTAL GROUP ELECTS OFFICERS

Professor Mario Graziani of Sao Paulo was elected recently to the presidency of the Associacao Brasileira de Cirurgia Buco-Maxilar. Other officers include: Chryso Fontes, first vice-president; Leonelo Fortini, second vice-president; Ary Lomonaco, general secretary; Jayme Barandes, secretary; Hory Botto, treasurer, and Cyro Silva, editor.

Public Health

DELANEY REPORT SOFT PEDALS MERITS OF FLUORIDATION

A recommendation that fluoridation be determined by each community and that research be expanded to determine its long range effects has been issued by the House of Representatives' Select Committee to Investigate the Use of Chemicals in Foods and Cosmetics.

The committee, which closed its hearings on fluoridation in March, issued its recommendations after Congress had adjourned.

In the official report, chairman James J. Delaney (D., N.Y.), and the six members of his committee note the benefits of fluoridation, cite its endorsement by "highly qualified and reputable organizations," and announce that "the majority of scientific opinion is that fluoridation of drinking water in amounts up to one part per million of fluorine is safe."

However, the report draws its conclusions from a minority opinion: "When we find communities ingesting a fluorine content such as indicated and nevertheless have gotten along well and apparently have had no recorded pathology, yet we wonder how well controlled was the examination and whether there is not something after all that did develop that we do not know anything about."

In its final recommendations, the committee states that dental decay does not constitute "a serious danger to health," and suggests that topical fluoride applications be used as a substitute for water fluoridation for the present.

The February hearings of the Delaney committee were notable for the harsh treatment accorded witnesses who testified to the safety and benefits of fluoridation.

Proponents of fluoridation included representatives of the American Dental Association, U. S. Public Health Service, National Cancer Institute, National Institute of Dental Research, National Research Council, Association of State and Territorial Health Officers, American Public Health Association and the American Medical Association.

Members of the Delaney committee included: Thomas G. Abernethy (D., Miss.), E. H. Hedrick (D., W.Va.), Paul C. Jones (D., Mo.), A. L. Miller (R., Neb.), Gordon L. McDonough (R., Calif.), and Walt Horan (R., Wash.).

FLUORIDATION PLAN FOR PUERTO RICO OUTLINED

A six-year plan for the fluoridation of public water supplies in Puerto Rico has been submitted to health authorities by José M. Gonzales, consultant in the bureau of oral hygiene of the Puerto Rican Department of Health. As several of the island's government agencies have already approved the plan, Dr. Gonzales has recommended that it be put into effect within the next year.

Under the supervision of the health and water departments, the fluoridation project would be carried out in separate communities, according to Dr. Gonzales. "By the end of the six-year period, we

expect to carry the benefits of fluoridation to an approximated 42 per cent of the total island population," he writes.

The rest of the population lives in nonconsolidated areas and in one municipality where facilities are not adequate for fluoridation.

"The need for dental care is shown by the dentist-population ratio of one dentist to 7,500 inhabitants. In a study of school children made by Marshall-Day, et al., a DMF of 8.0 was obtained from examination," Dr. Gonzales writes.

The dental profession in Puerto Rico has advocated the fluoridation of community water supplies for several years. Cooperating with Dr. Gonzales in the fluoridation plan were Henry Rodriguez, chief of the water supply section, and Juan G. Figueroa, chief of the bureau of sanitation.

WASHINGTON, D. C., BEGINS WATER FLUORIDATION

Fluoridation of the water supplies of Washington, D. C., began June 23, as district commissioners switched on the $100,000 installation which adds sodium silicofluoride to the drinking water of almost a million persons. The fluoridation project was authorized last September by Congress as a measure to reduce the incidence of caries in children.

PUBLIC HEALTH WORKERS TO MEET IN OCTOBER

Methods of interpreting fluoridation projects to the community will be discussed during the coming annual meeting of the American Public Health Association, to be held October 20-24 in Cleveland.

More than 5,000 professional public health workers from all parts of the free world are expected to attend, it was announced recently by Reginald M. Atwater, executive secretary of the organization.

USPHS NAMES P. H. JESERICH TO ADVISORY COMMITTEE

Paul H. Jeserich, dean of the University of Michigan dental school, has been appointed to the U. S. Public Health Service's advisory committee on foreign students and visitors. The committee members will advise the Public Health Service on the objectives, development and improvement of training programs for foreign students. Dr. Jeserich is a member of the American Dental Association's Council on International Relations.

NAME HEAD OF USPHS DIVISION OF DENTAL PUBLIC HEALTH

Thomas L. Hagan has been appointed chief of the Division of Dental Public Health of the U. S. Public Health Service, it was announced June 30 by Leonard A. Scheele, Surgeon General of the USPHS.

Dr. Hagan was formerly assistant chief of the division and dental consultant for Federal Security Agency Region III in Washington, D.C. He succeeds John W. Knutson, who has been named chief dental officer of the U.S. Public Health Service.

A graduate of the Georgetown University School of Dentistry, Dr. Hagan obtained his master's degree in public health at the University of Michigan and has served for 23 years in the USPHS.

Veterans Administration

VA ANNOUNCES NEW POLICY ON OUTPATIENT DENTAL CARE

Under new Veterans Administration regulations, an eligible "post-Korea veteran" may receive needed dental outpatient treatment from the VA while his application is pending. The treatment will be discontinued if his disability is not

judged to have been incurred or aggravated by service. This procedure, a recent VA announcement stated, will "prevent any delay in furnishing outpatient treatment for such veterans."

In general, application for dental treatments will be approved by the VA if examination reveals that the dental disabilities existed within a year after the veteran's release from service. However, the replacement of missing teeth will be authorized only if they are necessary to correct defects which have already been proved to be service-connected.

To be eligible, the veteran must file his application for dental treatment within 12 months after his discharge and must be a veteran of at least six months active service, terminating on or after June 27, 1950.

BION R. EAST COMMENDED IN SPEECH BY SENATOR HUNT

Bion R. East, assistant chief medical director for dental service of the Veterans Administration, was highly praised in a recent speech by Sen. Lester C. Hunt (D., Wyo.) in the United States Senate.

The remarks of Senator Hunt, as reported in the *Congressional Record*, follow:

Mr. President, on September 7, 1948, Dr. Bion R. East accepted appointment as Assistant Chief Medical Director for Dental Service of the Veterans' Administration. Dr. East reluctantly severed his connection with Columbia University to accept this invitation to public service in the interest of the veteran and the taxpayer. At Columbia he was associate dean, faculty of medicine, and executive officer, department of dentistry, an assignment to which he was particularly well fitted by his years of experience in the private practice of dentistry, public health, and professional educational fields. At present he is on leave of absence from the university as professor of dental public health practice in the school of public health.

The invitation to head the Dental Service of the Veterans' Administration presented a challenge and an opportunity to work for the improvement in the health services rendered to veterans. Although his acceptance entailed sacrifices and meant a heavy burden on his time and energy, personal considerations were not allowed to interfere in his decision.

There can be no question that his selection was most fortunate, and that the interests of the veteran and the Government, during his tenure, have been served in a very outstanding manner. Although prevented by some legislative and administrative blocks from fully accomplishing his objectives, his untiring efforts have been responsible for many improvements in the Dental Service. These include:

The appointment of outstanding specialists as consultants for use in furthering the training of full-time dentists, in providing veterans with efficient modern dental care;

The establishment of a training program which provides for post-graduate training of full-time employees at universities, and the use of recognized authorities in special fields for lectures at Veterans' Administration installations;

The development of the VA dental residency program at selected hospitals. This program is now under way at several stations, and is to be expanded;

The creation of a prosthetic training center in Washington, D. C., for advanced training of dentists and dental technicians in this field;

The planning and development of a dental training center, to be located in one of the new Chicago VA hospitals for training of VA dentists in oral diagnosis, periodontia, oral surgery, operative and prosthetic dentistry;

The reduction of dental outpatient treatment backlogs, which had formerly caused great delay in treatment of veterans, to an almost current state at this time. The use of VA clinics in providing dental examinations has allowed greater choice by the veteran of home town dentists for his treatment;

An increase in professional efficiency, by bringing into better balance the ratio of subprofessional to professional personnel, with a resultant conservation of professional manhours;

Improved diagnostic service in VA hospitals by initiating a change in policy which now requires dental examination of all hospitalized veterans wherever possible;

Improved integration of the dental service in the over-all health services of the Department of Medicine and Surgery to insure more effective treatment for the veteran beneficiary. This includes a program for integrating dental care of psychotic and tubercular patients with their over-all treatment to expedite their return to useful citizenship or to increase the

comfort and over-all health of those for whom a cure cannot be anticipated;

More effective field supervision, with an increased number of supervisory visits to installations and an over-all decrease in expenditures for this purpose.

Many other reforms which have been made have resulted in improved service to veterans, increased morale of dental service employees, more effective use of funds appropriated for dental care of veterans, and improved relations with the public and the profession.

Dr. East has been commended by resolution of the trustees of the American Dental Association, the American Association of Dental Schools, as well as by several State dental societies, for his sound administration of the dental program of the Veterans' Administration.

His unimpeachable philosophy of service, his drive, and his unlimited energy have served to generate a profound respect and cooperation from the employees under his supervision, who appreciate his leadership and guidance.

While the Dental Service of the VA is under his direction, the administration of the dental affairs is being accomplished in a most efficient and capable manner.

National Defense

SEPTEMBER DRAFT CALL TO INCLUDE 90 DENTISTS

The Department of Defense has asked the Selective Service System to call up 90 dentists for induction into the Air Force during September, it was announced recently. The inductees will be drawn from Priority II, although some Priority III registrants may be tapped.

Deferment of dentists for essentiality should follow the pattern set in Illinois, according to a recent bulletin of the National Advisory Committee to Selective Service. The Committee urged that deferments be limited to six months, and that the deferment be ended at that time unless a community chamber of commerce or other agency testifying to the dentist's essentiality can prove that vigorous efforts to replace him have failed.

NAVY DENTAL CORPS TO GROW WITH MARINE CORPS

The Marine Corps has been authorized through Congressional legislation to increase its strength to 400,000 men, from a peace-time strength of 70,000. As Marine Corps dental needs are served by the Navy, an additional 693 Navy dentists must be assigned to care for Marine

Maj. Gen. George R. Kennebeck, USAF (DC) stands next to an oil portrait of himself presented by officers of the Air Force dental service upon his retirement as dental chief for the U. S. Air Force. Presentation of the portrait was made by Maj. Gen. Harry G. Armstrong, USAF surgeon general, at a formal dinner held in General Kennebeck's honor. The portrait was painted by T. E. Stephens, well-known New York artist.

At his retirement, General Kennebeck also was awarded an Oak Leaf Cluster to his Legion of Merit Medal.

Corps personnel by the time the Corps attains full strength, according to an announcement from the Council on Legislation.

ARMY TO OFFER POSTGRADUATE COURSES IN ORAL SURGERY

Five-day postgraduate courses in oral surgery will be offered September 22-26 at Letterman Army Hospital, San Francisco, and December 1-5 at Walter Reed Army Medical Center, Washington, D. C.

Although presented primarily for military dentists, the courses will be open on a 10 per cent quota basis to civilian dentists.

At Walter Reed instruction will be under the supervision of Brig. Gen. Oscar P. Snyder and Col. Jack B. Caldwell. At Letterman the course will be supervised by Col. Marhl H. Welch and Col. Robert B. Shira.

Dental officers on active duty may apply to the Office of the Surgeon General, Department of the Army, Washington 25, D. C., attention of the personnel division, career management branch. Dental officers on inactive status may apply to their Army area commander, attention of the dental surgeon. Civilian dentists may submit their applications to the commanding general of Walter Reed or Letterman Hospital. Applications should be filed at least six weeks before the opening date of the course in question.

Research

FREDERICK S. McKAY AWARDED HONORARY DEGREE

Frederick S. McKay of Colorado Springs, Colo., was awarded an honorary degree of Doctor of Science from the University of Pennsylvania at its recent commencement exercises. Dr. McKay was honored as "a pioneer in fluoridation for the control of tooth decay." He was graduated from the University in 1900.

SUGAR RESEARCH FOUNDATION TO SUPPORT CARIES RESEARCH

The Sugar Research Foundation has awarded a grant of $6,000 to two physiologists at the Emory University School of Dentistry, for research to be conducted on the dietary factors involved in the causation of dental caries. The recipients of the grant are John Haldi, professor of physiology, and Winfrey Wynn, assistant professor of physiology.

In 1943 and 1945, the two men received grants from the Foundation to conduct research on blood sugar problems.

General

DENTAL EXAMINERS TO PRESENT SEMINARS ON TESTING

Three seminar-workshops will be presented at the meeing of the American Association of Dental Examiners, to be held September 5-6 in St. Louis. Topics for discussion will be operative dentistry, prosthodontics, and oral diagnosis and treatment planning. The three sections will be presented simultaneously on Friday afternoon and again on Saturday morning, it has been announced by Arthur W. Easton, chairman.

The operative dentistry section will be composed of Byron W. Bailey of Bradford, Vt., moderator; Frank S. Maxey of Nashville, Tenn., secretary; O. F. Anderhalter and Webb B. Gurley of St. Louis, and Roscoe M. Justice of Ashland, Ky., participants.

The symposium on oral diagnosis and treatment planning will be conducted by John A. Brunner of North Kansas City, Mo. Participants will include Florian J. Martin of Medford, Wis.; John T. Bird of St. Louis, and Carl W. Sawyer

of Kansas City, Mo. Secretary of the section will be John J. Byrne of St. Louis.

Moderator of the prosthodontics section will be Reuben E. V. Miller of Easton, Pa. Participants in the discussion will include A. J. Heffernan of Wilkes-Barre, Pa.; Paul R. Smith of Lewiston, Me.; John D. Adams of St. Louis; S. T. Williams of St. Louis, and Stanford S. Kight of Philadelphia. The secretary will be Robert Adams of Philadelphia.

B. G. BIBBY TO ADVISE NATIONAL MEDICAL LIBRARY

Basil G. Bibby of Rochester, N. Y., will represent the dental profession on the advisory group to the new Armed Forces Medical Library in Washington, D.C. Dr. Bibby, together with four other civilians and three medical military officers, will advise the administration of the new library, which will replace the Army Medical Library as the national library for medicine and related sciences.

A.A.D.S. TO MEET SEPTEMBER 6 IN ST. LOUIS

On September 6 the American Association of Dental Schools will hold an all-day meeting at the Hotel Statler, St. Louis, it has been announced by Marion W. McCrea, of Baltimore, secretary-treasurer of the organization. The meeting date was incorrectly reported in the July issue of THE JOURNAL.

DENTAL TRADE OFFICIAL, BENJAMIN WEINRACH, DIES

Benjamin Weinrach of Philadelphia, executive secretary of the Dental Manufacturers of America, died July 16 in Philadelphia. Mr. Weinrach directed the trade association's main office in Philadelphia for many years and was well known among members of the dental profession.

DENTISTS' INCOMES SURVEYED BY COMMERCE DEPARTMENT

The average dentist in the United States had a net income of $7,743 in 1951, according to an official estimate published by the Department of Commerce during the last week in July. This figure compares with $7,293 in 1950 and $7,037 in 1949.

These and other income estimates for physicians, dentists and lawyers are presented in tabular form in the publication, "Survey of Current Business." The Department of Commerce gathered information for the report by surveying several thousand professional men and employing data thus obtained in conjunction with figures obtained in large-scale surveys that were conducted a few years ago.

The median income for dentists—the figure exceeded by 50 per cent of the dentists and not reached by the other 50 per cent—was $6,501 in 1951, compared to $6,178 in 1950 and $5,970 in 1949, according to the findings.

Dentists in independent private practice averaged $7,856 last year, $7,468 in 1950 and $7,168 in 1949. Median figures for the same years were, respectively, $6,669, $6,390 and $6,137. Information was not obtained for comparable figures applicable to dentists whose incomes are derived mainly from salaries.

MARGUERITE TAYLOR DEAN, FORMER PROFESSOR, DIES

Marguerite Taylor Dean, former associate professor of dentistry and director of the school of dental hygiene at the University of Tennessee, died recently. Dr. Dean, who had retired in 1949, was the widow of Richard D. Dean, dean of the University of Tennessee dental school for many years. The couple won recognition for dental research and were credited with fostering the growth of the Tennessee dental school during their administrations.

SOUTHWESTERN SOCIETY OF ORTHODONTISTS TO MEET

A four-day meeting of the Southwestern Society of Orthodontists will be held October 26-29 at the Gunter Hotel in San Antonio, Texas. Dan C. Peavy of San Antonio, president of the Society, will preside. Further information may be obtained from Fred A. Boyd, secretary-treasurer, 1502 North Third, Abilene, Texas.

DENTAL SCHOOL ALUMNI PLAN 50th ANNUAL MEETING

The fiftieth annual meeting of the University of Buffalo School of Dentistry Alumni Association will be held October 7-9 at the Hotel Statler in Buffalo. Cooperating with the Alumni Association is the Eighth District Dental Society of the State of New York. All dentists have been invited to attend.

Further information on the program may be obtained by writing to Peter L. Battista, secretary of the organization, 232 Delaware Avenue, Buffalo.

PLAN MEETING OF SOCIETY OF GOLD FOIL OPERATORS

The International Society of Gold Foil Operators, a new organization, will hold its first meeting at a dinner September 11 at the Chase Hotel, St. Louis. The primary object of the Society is "promoting the use and advancement of gold foil in dentistry," it was announced by Bruce B. Smith of Seattle, chairman.

The program at the dinner meeting will include guest speakers and a discussion of final organizational plans. An open invitation has been issued to interested dentists by the Society. Further details may be obtained by writing to Bruce B. Smith, 812 Cobb Building, Seattle 1.

DENTAL EDITORS TO MEET IN ST. LOUIS SEPTEMBER 6

The American Association of Dental Editors, in cooperation with the Council on Journalism, plan a full day conference on Saturday, September 6, at the Hotel Jefferson, St. Louis, in connection with the 93rd annual session of the American Dental Association.

Participants in the program include Willard Ogle, who will speak on editorials; J. C. Almy Harding, who will discuss the organization and operation of a dental journal, and Ralph Rosen, who will present the problems of a local dental bulletin editor. Mr. A. Flieschman, a St. Louis public relations counselor, will discuss semantics and Mr. L. A. Batterson will present a practical paper on the selection of type and preparation of copy for the printer.

The essay program will be preceded by a short business meeting and followed by a meeting of directors of the A.A.D.E.

Dental editors and others interested in improving dental journalism are invited to attend.

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editors reserve the right to edit all communications to fit available space and require that all letters be signed. Signatures will be deleted before publication at the request of the author. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

RESPONSE TO A LETTER AGAINST INCLUSION IN OASI

I was greatly interested in a letter which appeared in the May issue of THE JOURNAL entitled, "The Case Against Including Dentists in Social Security," as it indicates the thinking of those opposed to inclusion of dentists.

The writer states that since 1939 the dollar has shrunk from $1.00 and is now worth 40 cents, and that at this rate it will be worthless in another eight years. If this be true, all fixed income securities will evaporate in a very few years; therefore, all dentists whose estates are invested in life insurance, bonds and building and loan companies should cancel these investments and spend their money immediately. If that correspondent's reasoning be sound, most of the institutions which now have a tremendous backlog of fixed income securities such as government bonds, must be practically insolvent—and will be bankrupt in eight years (although, of course, I do not agree with that idea).

The writer further states that his inclusion under social security is not to his best advantage because of its compulsory features. Yet we live under many compulsory provisions which are definitely to our best advantage. For instance, without some compulsory laws, my life would not be safe on a dark night.

The writer also states that the government can change the rates, benefits or terms at its will and we can do nothing about it. The government, however, is ourselves. We elect the members of Congress and they can change the rates, terms and benefits at will; but we can no more expect them to do anything detrimental in this regard than we can expect them to devaluate the currency or demonetize the postage stamps.

He states that this would require fixed payments for a great many years or for life. He evidently does not understand that the amount he would pay for this security is based on amount of income: no income, no payment; small income, small payment. The maximum income on which he would pay would be $3,600 a year. Dentists with incomes of $60,000 and up would still only pay on $3,600 annually.

The writer finally states that a nationwide check of loan companies and banks made on March 14, 1952 showed that four times as many people are borrowing to pay their income taxes this year as in 1951. I wonder if he does not realize that all except the self-employed have their social security funds deducted from each salary check and thus, have not borrowed to pay them. An important fact in the case is that savings in loan companies and banks last year were the largest in the history of the United States and that this year they are running above last year.

If a dentist, for instance, has to borrow any money, it is to pay off the difference between the 1952 Cadillac which he is buying and the 1951 Cadillac which he is selling.

Harry Comeau, D.D.S., Monterey Park, Calif.

TRADE ORGANIZATION FOR DENTAL OFFICE MANAGERS

The number of dental offices—such as this one—in which several dentists practice, seems to be increasing. Undoubtedly many of these offices also employ business or office managers. We dental business managers have many problems peculiar to our particular field; we should have a means of communicating with each other.

I would be glad to hear from other dental office managers interested in forming an association to further our own efficiency. In the event that this business function is still too new and little-used to enable us to form a trade organization, we might exchange information by letter.

Edward H. Winsor, Richmond 2, Calif.

Book Reviews

CLINICAL DENTAL ROENTGENOLOGY

By John Oppie McCall and Samuel Stanley Wald. Third edition. 384 pages with 475 illustrations. Index. Price $8.50. Philadelphia, W. B. Saunders Co., 1952.

The third edition of this text contains the good clear halftones which characterized the second edition. Convenient in size and easy to handle, this volume serves well as a textbook for the undergraduate and also as a guide for the practitioner, since it contains many helpful suggestions.

The descriptive matter in this book, together with the illustrations, is usually sufficient to convey the intended message to the reader. The interpretative material is presented quite clearly also, but a little more clarity on technic for the conventional intraoral examination would enhance its value.

The schematic diagram of the molars on page 35 scarcely bears out the true anatomical findings. The mandibular molars, for example, are not vertical but are invariably inclined lingually. The degree of inclination necessitates a corresponding change in the vertical angle of projection to avoid foreshortening of the image. This condition is still more pronounced in the diagram of the mandibular bicuspid. In the text, the bicuspid appears to be buccally inclined. Again the technic suggested for projecting this tooth may result in a distorted image.

It is very enlightening to note that the authors included chapters on the so-called "long cone technic" and on "cephalometric technic." Both phases of roentgenology are commanding increased attention and such information should be included in a course of instruction.

It is implied in the text that an effort at paralleling the film packet with the long axes of the maxillary molars is necessary only when using the long cone technic for projections. On the contrary, it is always desirable to carry out the effort at paralleling both as far as possible regardless of the target film distance. Also in this chapter on long cone technic, the value of this technic would have been more evident if there had been several illustrations to demonstrate its value over what is usually referred to as the conventional technic.

The interpretation of abnormal and pathological findings is excellent throughout. On the whole, this is a fine volume to add to any dental library.

Lee Roy Main

PRINCIPLES AND PRACTICE OF BACTERIOLOGY

By Arthur H. Bryan and Charles G. Bryan. Fourth edition. 410 pages with 79 illustrations. Tabulated bibliography, appendix and index. Price $1.75. New York, Barnes & Noble, Inc., 1951.

In the fourth streamlined edition of this book, the broad and constantly changing field of bacteriology is completely covered, even though exhaustive details are necessarily omitted. Quick reference tables and charts are conveniently furnished for those requiring supplemental information. Typical civil service examination questions are available in the appendices.

The first part of the book concerns itself with basic principles of bacteriology. The chapter on dairy bacteriology has been enlarged, the electron microscope is more minutely described, and more space is devoted to tropical bacteriology.

The middle portion of the text deals with medical bacteriology. Viruses and rickettsiae are now listed according to their action and many newly-described virus diseases are noted. A chapter on bacteriophage is included.

Infection and immunity are covered in the last third of the book. The latest bacteriostatic agents are discussed as well as the newer antibiotics like aureomycin and bacitracin. Advances in the field of public health and rapid, accurate diagnostic tests and technics are explained.

With exhaustive references listed throughout the book and a bibliography at the end of each chapter, the authors point out further detailed descriptions of any phase of the field to a reader bent in this direction. A fact-packed, up-to-date compilation such as this book yields, is of interest to the embryonic reader of the subject, as well as of value to the student for review and reference purposes.

Morton Heide

Current Literature

JOURNAL OF ORAL SURGERY
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TREATMENT OF DEPRESSED FRACTURE OF THE ZYGOMATIC BONE

Walter W. Crowe, p. 3.

The diagnosis of fracture of the zygomatic bone is based on the history, local appearance, palpation, roentgenographic studies and the following signs and symptoms: (1) facial swelling; (2) depression or flatness of the face; (3) limitation of motion of the mandible resulting from muscular spasm, mechanical obstruction (depression of the zygomatic arch against the coronoid process) and pain; (4) ecchymosis; (5) unilateral nasal hemorrhage; (6) infraorbital anesthesia; (7) diplopia and (8) emphysema. The roentgenographic examination should consist of posteroanterior and verticosubmental views which give the clearest view of the maxilla and demonstrate well the position of the two inferior orbital margins and the degree of displacement.

Methods of treatment include the intraoral approach through the buccal fold, the external approach and the antral approach. One method found satisfactory is to elevate the displaced bone through a small incision which is made in the cheek according to the displacement of the bone. If the zygoma is badly comminuted, a steel hook usually proves unsatisfactory for elevation of these fragments; an intraoral incision with elevation from within may be necessary.

ERADICATION OF GAGGING REFLEX FOR FULL DENTURE PATIENTS

Charles W. Lincoln, p. 8.

Gagging, caused by the wearing of new dentures, is a most distressing condition. In some instances intolerance to the denture on the part of the patient persists in spite of various mechanical aids. In such a rare case, relief may be obtained from an injection of alcohol. The soft tissues overlying the approximate junction of the hard and soft palate are painted with a mixture of one part tincture of iodine and one part tincture of aconite, and the tissues are dried by a blast of warm air. The lesser palatine foramen is located on the posterior margin of the palatine bone. About 0.5 cc. of procaine hydrochloride is injected into the soft tissues on either side approximately 4 mm. distal to the foramen. The denture is inserted to make certain that the gag reflex has been eliminated. Should results prove satisfactory, the denture is removed and about 10 minims of 190 proof alcohol is injected into the same regions. The effect of the alcohol usually wears off after a few months; by that time the patient is free from complaints.

THE MANDIBULAR THIRD MOLAR

P. Philip Gross, p. 9.

The mandibular third molar is classified as vertical, mesioangular, distoangular and horizontal, according to the position of the crown in relation to the vertical second molar. The classification of the mandibular third molar depends on the interrelationship of the position of the tooth as found in the sagittal plane in the lingual roentgenogram and the occlusal plane in the occlusal roentgenogram. Practical experience has shown that the successful removal of the mandibular third molar, impacted or not, depends on correct roentgenographic interpretation and clinical diagnosis in conjunction with an operative technic applicable to the case at hand. The removal is accomplished in either of two ways: (1) by removing the ossistructure distal to the third molar, thus creating a space distal to the third molar to permit the elevation of the tooth into the space created in the line of least resistance; (2) by sectioning of the crown and the roots of the third molar and removing the tooth in sections, thus creating spaces mesially and distally.

The ideal operative procedure is to remove the tooth with the minimum destruction of the ossistructure and without harming the neighboring teeth. The less ossistructure excised, the less pain follows the removal. The mucoperiosteal flap is designed to expose the operative region and not to interfere with the lingual tissue. Any ossistructure over the crown is excised by such means as the ossisector, hand chisel, bone drills and impactor with complete exposure of the occlusal surface of the tooth. Tooth division is accomplished after the ossistructure over the crown is removed. No attempt should be made to elevate the tooth before sectioning. The mandibular third molars are sectioned in the following sequence: (1) sectioning of the distoocclusal portion of the crown to create a space for

distal displacement of the tooth in conformity with root inclinations; (2) sectioning of the mesioocclusal portion of the third molar; (3) sectioning through the long axis of the tooth, dividing the roots of the tooth longitudinally; (4) sectioning of the third molar transversely, separating the crown from the roots. Sometimes a combination of ossistructure removal and tooth sectioning has been found most advantageous.

ODONTOMA OF THE MAXILLARY SINUS

Merritte M. Maxwell and C. H. Blackstone, p. 22.

Odontoma is a tumor of odontogenic origin which, because of its insidious onset, may reach massive proportions before it is diagnosed. The most common symptom of this tumor is swelling of the maxilla or the mandible; the swelling is painless unless the lesion by encroachment upon adjacent anatomic structures produces inflammation with its sequelae. Since odontogenic structures normally produce calcified tissues, a large percentage of odontomas contain hard tissue; indeed, soft odontomas, either simple or mixed, are rare. The calcified tissue may be either ectodermal or mesodermal and is usually distorted by dystrophic changes. Odontoma develops from one or more types of odontogenic tissue in any phase of the maturation process whenever the neoplastic activity is instituted. The complex odontoma may have an associated malignant tumor or a malignant element superimposed on the benign lesion. Therefore, histopathological study of the gross specimen is always indicated.

LONG-STANDING DISLOCATION OF THE JAW

Otto Gottlieb, p. 25.

Dislocation of the jaw is caused by forced opening of the mouth—usually bilateral—or by a blow on the mandible—usually unilateral. In both cases the condyle or condyles are displaced forward, below and in front of the articular tubercle, where the condyle or condyles become fixed by muscle spasm or by tension in the ligaments and joint capsule. Unlike dislocations of other joints, tearing of the capsule is rare in dislocation of the jaw. Detachment of the interarticular disk is seldom seen, but it may occur and is probably responsible for the majority of irreducible dislocations of the jaw which call for open reduction, often involving removal of the disk. Several authors have reported that unilateral dislocation may exist with fair function. Bilateral dislocation, on the other hand, is nearly always accompanied with poor function, although some cases have been reported in which the patients got along well for years without any treatment. When closed reduction proves unsuccessful, the method of choice is arthrotomy, which allows the surgeon to determine whether open reduction, perhaps combined with removal of the disk, is sufficient or whether condylectomy must be performed. Condylectomy is often necessary to prevent ankylosis.

CLOSURE OF AN ANTRAORAL OPENING BY USE OF THE TANTALUM PLATE

Clare T. Budge, p. 32.

Attempts are being made to perfect a simple method for the immediate closure of the maxillary sinus and also of chronic antraoral openings after tooth extraction. One method which has been found satisfactory is to use a 32 gage tantalum plate. Immediately after the removal of a tooth, the lingual and buccal mucoperiosteum is retracted from the adjacent teeth a sufficient distance to allow the insertion of the contoured U-shaped tantalum plate to cover the entire socket. After the insertion of the tantalum plate over the socket, the mucoperiosteum is sutured back to its normal position. When sufficient time has elapsed for granulation tissue to form in the tooth socket, the tantalum plate is raised from the healed tooth socket with a hooked instrument, cut in two pieces mesial-distally and removed.

To close a chronic antraoral fistulous opening, the surgical procedures are much the same as those followed in immediate closure after a tooth extraction except that the maxillary sinus should be free from infection and the fistulous tract from the maxillary sinus to the oral cavity should be removed. The tantalum plate is not removed after the closure of a chronic antraoral fistulous opening.

NEVI

Lloyd E. Church, p. 34.

Nevi are exceedingly common growths. When an abrupt change in size or color of a nevus occurs, a person should exhibit much more than just a passing interest. Most nevi should be left alone and need not be removed. Usually, the darker the nevus is, the more likely it is to have malignant properties. The blue nevus, believed by some investigators to be a threatening lesion, infrequently develops into melanoma. Evidence has been

presented that all malignant melanomas develop from a pigmented lesion described as a junction nevus, arising from the epidermodermal junction. The junction nevus occurs most frequently on the head, hands, feet and genitals. A sudden change in rate of growth, bleeding, change in color, a painful or itching feeling, an inflammatory halo or ulceration of a nevus have long been considered early signs of melanoma. In most cases there is a history of trauma, usually chronic. A potentially malignant nevus should be excised completely with a margin of normal skin. The incision should extend through the full thickness of the skin and subcutaneous tissue. Many nevi are likely to become malignant while gonadal secretion is at its maximum. It has been suggested that mole growth is under hormonal control. Many melanomas develop during pregnancy when the endocrine system is especially active.

PHYSICAL TREATMENT OF TRISMUS AND PARTIAL ANKYLOSIS OF THE TEMPOROMANDIBULAR JOINT

Ath. P. Panagopoulos, p. 36.

Despite efforts to remove the causes of trismus and partial ankylosis of the temporomandibular joint, it is difficult to alleviate the symptoms. In such cases the application of physical treatment as soon as possible is indicated. The special equipment required for treatment should fulfill the following requirements: (1) The action of the equipment should be mild and continuous. (2) The equipment must be such that it can be placed and used gently on a patient for all degrees of trismus. (3) The force of the pressure should be under control at all times.

A new type of exerciser has been devised and used with satisfactory results. It consists of two perforated trays similar to those used in taking impressions. The upper plate has no palatal base, the lower no lingual wall. In the two sides of each tray are horizontal tubes approximately 1 cm. in length, into which are forced the secondary springs. In the anterior portion and in the midline there is a special support to which one or two principal springs are attached. A crescent-shaped notch on the labial wall of a tray protects the lips from injury. This exerciser has been widely used in Greece since 1942; results have been satisfactory in the majority of cases of trismus. If the patient cooperates and does the exercise systematically, the opening movements of the mouth are normal after a week or 10 days.

THE PREVENTION OF ANESTHETIC FATALITIES

E. A. Rovenstine, p. 40.

Anesthetic fatalities are due to one of two causes: either the anesthetic is administered improperly or the anesthetist lacks the judgment needed to select the patients who should be given a general anesthetic. A single drug and a single technic cannot be used for every patient who may need relief from pain during exodontia or oral surgery. The selection of patients who can be given a general anesthetic is the most important consideration in preventing anesthetic fatalities. Today many people have heart disease. The excitement that may attend a trip to the surgeon's office or the fear of losing consciousness after an anesthetic may tax a heart already overburdened to the extent that it may fail to carry on essential activity. Among the patients with cardiac disease who should be denied a general anesthetic except under the most favorable circumstances and expert administration are those with valvular lesions, particularly mitral stenosis, which often follows an attack of rheumatic fever. Patients with arteriosclerosis, with reduced coronary circulation, with a heart muscle which is not getting enough oxygen and with an abnormal cardiac rhythm may have a sudden onset of fibrillation and consequently heart failure. There are some simple questions and observations that aid materially in determining the probability of serious heart disease. Cyanotic mucous membranes are suggestive, and swollen ankles are an indication. If a patient becomes short of breath on slight exertion or experiences pain in the chest with exercise, it is usually because of circulatory inefficiency.

Since deaths do occur as a result of nitrous oxide anesthesia, it must be assumed that technical errors are committed or that the present approved principles governing the administration of nitrous oxide are at fault. In order to prevent fatalities from anoxia during or following the administration of nitrous oxide, the use even for short periods, of 100 per cent nitrous oxide must be regarded as dangerous; the use, for longer periods, of mixtures of nitrous oxide containing less than 20 per cent oxygen must be considered potentially dangerous.

Modern anesthetists must decree emphatically that the patient is not to be fitted to the anesthetic technic, but that new technics must be devised to meet the circumstances. Anoxia frequently results from obstruction to the respiratory airways. Obstruction frequently is due to the soft tissues such as the tongue, or to packs or instruments. No anesthetic

agent should be administered in the presence of obvious obstruction. Ambulatory patients whose intake of food is not controlled or those who may use alcohol to bolster up their courage for the ordeal in the dentist's office are likely to become nauseated. Preventing aspiration of vomitus is best done by taking advantage of the patient's reflexes and placing him with his head down to aid removal by gravity. No one should administer an anesthetic who has not mastered methods for adequate artificial ventilation of the lungs.

INTERNAL DERANGEMENTS OF THE TEMPOROMANDIBULAR JOINT

Don H. Bellinger, p. 47.

There has been delay in applying to the temporomandibular joints the same sort of microscopic study that has brought understanding of other joints of the body. Most cases of arthritic involvement of the temporomandibular joint fall into one of four major groups: (1) cases in which arthritis results from acute direct trauma to the joint; (2) the frankly infectious cases caused by a specific microorganism; (3) cases of unproved etiology, probably due to endocrine dysfunction; (4) cases representing degenerative forms of joint disease. Only a condition caused by acute direct trauma is indicated by the term "traumatic arthritis." Traumatic joint disease is usually mono-articular. The symptoms, usually acute with sudden onset, include pain, particularly on motion, and localized tenderness. In acute traumatic disease of the temporomandibular joints treatment consists of rest, cold applications in the early stages followed by heat in the later stages and administration of analgesics for the control of pain. Infectious arthritis has reference to the metastatic invasion of the articular structures by specific organisms. The organisms of gonorrhea, syphilis and tuberculosis are the chief offenders in this type of arthritis. The cardinal signs of inflammation are usually present, and pain is often severe. Rheumatoid arthritis is still not fully understood. The temporomandibular joint, which is always associated with generalized rheumatoid arthritis, may become involved.

Degenerative joint disease is a process associated with the physiologic aging of the tissues of joints; it is aggravated by strain, microtraumas and deformities. Changes due to daily wear and tear are accumulative; if they exceed the limited capacity for repair, subjective symptoms may result. The development and eruption of the teeth with the resulting intermaxillary relationships are important factors in the balance between the condyle and the mandibular fossa. Once the joint has developed in accordance with functional demands, new or greater demands are certain to produce an interarticular imbalance. It is never mono-articular in the temporomandibular articulations even though it is rare that both sides become symptomatic concurrently or even eventually. The cardinal symptom is pain, which occurs with use and is relieved by rest. These cases are particularly responsive to slight trauma that would not produce symptoms in the normal joint. While degenerative change of the temporomandibular joints can occur in the young, it is usually an affection of middle or old age. From a pathologic standpoint, this disease is chronic and cannot be cured. Nevertheless, much can be done to relieve symptoms and to prevent, or at least retard, progression of the pathologic conditions. One of the most important points in treatment is to reassure the patient that the disease is annoying but not serious, that it is not a crippling arthritis. Patients with degenerative changes of the temporomandibular joints should be advised to live within their affliction if possible. All factors which tend to cause abnormal or excessive stress or strain on the joints should be corrected. In the early stages of treatment most patients benefit symptomatically from heat and massage over the affected part. Analgesic drugs are helpful in controlling pain but should be used cautiously. When corrective and supportive treatment has failed to control the pain so that the patient can live with the affection, surgical intervention in the form of meniscectomy is an acceptable procedure.

CANCER OF THE GINGIVA

Ian Macdonald, p. 58.

The gingival mucosa is the third most common site of oral cancer. Numerically more common are the malignant neoplasms which arise in the lip and tongue. An adequate diet and a clean mouth offer excellent prophylaxis against all forms of intraoral cancer. Cancer arising in an established area of leukoplakia, is less commonly observed in the gingiva than in the tongue and buccal mucosa. Nevertheless, thickened plaques of leukoplakia may be the soil in which gingival carcinomas develop; as a prophylactic measure they should be eradicated and biopsies should be taken. Ulceration of a lesion in its early stage is usual, and there may be an elevated indurated border representing the limits of the lesion. Fixation to the periosteum occurs early, even without actual infiltration. Any erosion of the

gingiva which is not clearly traumatic should be biopsied. Present trends are toward surgical treatment of gingival carcinoma. For other than early lesions of low grade malignancy, ideal treatment consists of a combined radical block dissection of the neck on the side of the lesion to remove actual or possible metastases and resection of the mandible and adjacent soft tissue. At present, results in terms of five-year cures are 40 per cent for reasonably early cases and 25 per cent for advanced cases.

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PANOGRAPHIC RADIOGRAPHY

Robert J. Nelsen, p. 158.

An apparatus has been developed which automatically exposes a special strip of film to produce a usable image of an entire dental arch. The apparatus is adjustable to the variations in size and shape of the dental arches.

HOMOLOGOUS AND HETEROLOGOUS INTRAOCULAR GROWTH OF TRANSPLANTED TOOTH GERMS

Harold S. Fleming, p. 166.

In recent experiments tooth germs retained a capacity for growth, differentiation and development when homoplastically or heteroplastically transplanted to the anterior eye chambers of guinea pigs and rabbits. In mice, however, homotransplants of tooth germs showed a rapid degeneration in anterior chambers but growth and development in the axillae and brains. After 30 to 40 days, transplants usually began to appear less vascular and smaller. Histological examinations showed that over longer periods a revision gradually took place whereby the calcified tooth structures were replaced with an osteoid tissue. When separated from each other, odontoblasts generally and ameloblasts less frequently appeared capable of continued development and of the formation of mature tooth structures. Growth was always confined to the anterior chamber of the eye. Rabbit homotransplants grew most rapidly and gave the best results. Human transplants of tooth germs grew better in guinea pigs than in rabbits. The fact that tooth germs survive intraocular transfers offers a new approach to further studies of their growth and development.

PRELIMINARY STUDIES ON THE PRESENCE OF ACID PHOSPHATASE IN CERTAIN ORAL MICROORGANISMS

Robert J. Fitzgerald, p. 189.

With p-nitro-phenyl phosphate used as the substrate, acid phosphatase activity was demonstrated in a number of oral microorganisms including streptococci, micrococci, lactobacilli and aerobacter. In a series of 30 saliva samples, acid phosphatase activity of whole saliva generally paralleled the results of lactobacillus counts and Snyder tests for caries activity.

DENTAL CARIES AND GINGIVITIS IN MALES 17 TO 20 YEARS OLD (AT THE GREAT LAKES NAVAL TRAINING CENTER)

Maury Massler, William Ludwick and Isaac Schour, p. 195.

Examination of 4,043 white male Navy inductees, 17 to 20 years of age, from various areas in the United States showed an average of 11.3 DMF teeth and 25.2 DMF tooth surfaces per person and an average of 5.2 PMA gingival units affected per person. No correlation, either positive or negative, could be demonstrated between gingivitis and dental caries experience in this sample of young adult males. This does not negate the necessity for further study of the relationship between caries and periodontal disease in persons of older age groups.

RELATION OF FUNCTION TO CARIES RATE

H. H. Neumann, W. Lefkowitz and N. A. Di Salvo, p. 200.

In an experiment designed to study the effects of vigorous mastication on caries incidence over a period of 18 months, 102 children received a daily supply of fibrous sugar cane which they chewed under supervision; 164 controls were divided in two groups, of which one received daily freshly milled cane juice and the other neither cane nor juice. The amount of chewing in the length of time or in the number of chewing motions was considered of minor importance compared with the force exerted during mastication. Sugar cane was selected because certain varieties have considerable taste appeal to youth and at the same time offer a maximum of hard bulk which does not lose its fibrous structure during mastication. Handicaps in the experiments were the difficulty of obtaining a steady supply of palatable cane and the generally poor dental condition of the children at the

outset, which in many cases interfered with the ability to chew adequately. The teeth were examined roentgenographically and with an explorer and mirror. Caries was scored by the DMF rate. The results obtained showed about 50 per cent less new cavities in the hard-chewing group than in the control group. The differences may be accounted for by the mechanical detergent action of the fibrous food or perhaps by the effect of vigorous function on the organic component in the enamel structure, which may cause an increased resistance to caries.

ELECTROMOTIVE FORCES AND ELECTRIC CURRENTS CAUSED BY METALLIC DENTAL FILLINGS

William Schriever and Louis E. Diamond, p. 205.

A survey of the literature since 1878 on the sources of possible electromotive forces for pairs of metallic fillings and for single fillings revealed that neither these forces nor their resulting currents had yet been measured and that no measurements were reported from which these forces and currents could have been calculated. Therefore, schemes for carrying out electrical measurements and theories for the calculations were devised. A condenser-ballistic-galvanometer potential-difference meter and later a vacuum-tube electrometer were developed and used in the measurements. Results were secured on 213 pairs of fillings in the normal mouths of 137 subjects and on 78 single fillings in the normal mouths of 66 subjects.

The following facts were ascertained: (1) the bone fluid is just as important as the saliva in causing electric currents; (2) there are satisfactory methods for determining the net electromotive forces and resistances associated with metallic dental fillings; (3) these resistances are concentrated at the metal-saliva and metal-bone-fluid contacts; (4) a method has been established for determining the net electric current through a metallic filling under ordinary oral conditions; (5) the magnitude of the current through any filling is virtually independent of the number and kinds of other fillings in that oral cavity provided that the filling does not make contact with any other metallic filling.

The conclusions are: (1) good evidence exists that serious pathologic conditions in the oral cavity have been caused by metallic dental fillings; (2) hypersensitivity of a subject to the metallic ions supplied by the fillings may be an important factor; (3) relatively large electric currents pass through metallic fillings if two such fillings are in contact; such contacts should be prevented.

A STUDY OF THE HEALING PROCESS FOLLOWING OPERATIVE INTERFERENCE WITH THE CONTINUITY OF THE RAT MAXILLA

William J. Dalton, p. 230.

Whereas investigators and clinicians generally agree that a fractured mandible heals by bony union, there is no unanimity of opinion as to the type of repair in a fractured maxilla. According to one view a fractured maxilla, just as fractured flat bones of the skull, usually heals only by fibrous union. The opposing view holds that the maxilla, like the mandible, is capable of healing by bony union. The present study was undertaken to ascertain whether the maxilla of the rat after experimental removal of a thin segment of bone to simulate fracture heals by fibrous or by bony union.

The animals used in this study were six male albino rats. A dental bur was employed to cut a slot approximately halfway through the zygomatic process extending anteriorly from the free edge of its posterior border. Roentgenograms were taken before and after surgery and following sacrifice, which took place at intervals of six and nine weeks and three, four, five and six months. Serial sections in a frontal plane were prepared of each head.

From the roentgenographic and histologic evidence obtained in this study of operative interference with the continuity of the rat maxilla, a study in which the factors of infection, mobilization and apposition of the fracture ends were eliminated, it can be concluded that the healing process results in bony union. There is no evidence of a cartilaginous callus stage in the process of healing. The sites of new bone formation which repairs the defect are the periosteum, the endosteum and the connective tissue callus. The end results in the presence of infection are bony union in spite of osteomyelitis.

THE VASCULARITY OF THE INCISOR PULP OF THE MONKEY AND ITS ALTERATION BY TOOTH RETRACTION

Earl O. Butcher and A. Cecil Taylor, p. 239.

The vascularization of monkey incisors has been outlined best by perfusing India ink through the vessels. Arteries pass from the alveolar bone into the apical pulp, then straight through the pulp, giving off branches

which extend toward the dentin and which continue as the capillaries. The capillaries form loops, many of which reach into the odontoblastic layer. The blood is returned to numerous dilated vessels which converge in the apical pulp into smaller and fewer veins. The latter are continuous around the root end, more frequently on the labial side, with veins of the periodontal membrane.

A retractive force of 250 Gm. directed on the long axis of the teeth with large apical foramens pushed them with sufficient force to strangulate the veins and to interfere with the arterial supply of the pulp, but a greater danger was altering of the vascular drainage by tipping the tooth labially. Vessels of teeth with small apical foramens were seldom strangulated apparently because of their form and more secure periodontal anchorage.

MORPHOLOGIC RELATIONSHIPS BETWEEN ENAMEL AND DENTIN SURFACES OF LOWER FIRST MOLAR TEETH

Bertram S. Kraus, p. 248.

Measurements were taken between apexes of cusps of 50 lower first molars taken from prehistoric Arizona craniums. The same measurements were taken on the cuspal apexes of the dentin surface after enamel was removed. Comparisons between enamel and dentin surfaces showed that: (1) the entaconid angle is consistently smaller for both surfaces; (2) there is a greater correlation in angulation between enamel and dentin apexes at the entaconid; (3) the enamel apical perimeter, both relatively and absolutely, is consistently larger; (4) the hypoconid-entaconid apical diameter is the largest on both surfaces; (5) the enamel apexes show more linguobuccal than mesiodistal displacement relative to their dentin homologues; (6) there is no apparent bilateral symmetry displayed in the various enamel and dentin biapical relationships; (7) mean maximum crown width and length for the dentin are nearly equal, but for the enamel the mean maximum length is significantly greater. The metrical and topical differences between enamel and dentin surfaces are perhaps the expression of genetic enamel growth factors which apparently operate unilaterally.

THE CORRECTIVE EFFECT OF PARATHYROID HORMONE ON GENETIC ANOMALIES IN THE DENTITION AND THE TIBIA OF THE *IA* RAT

S. N. Bhaskar and others, p. 257.

A roentgenologic and histologic study was made of the effect of parathormone on the dentition and the tibia of the *ia* rats, which are characterized by hereditary hypoosteoclasis and failure of eruption of teeth. The animals were divided into three groups: Group A consisted of 17 *ia* rats which were used as controls; Group B of 8 *ia* rats which were given 7 injections of parathormone (total dosage 140 I. U.); and Group C of 12 *ia* rats which received 33 to 39 injections of parathormone (total dosage 615 to 690 I. U.). The administration of parathormone resulted in the reduction of the incidence and severity of dental anomalies and pseudoodontomas and, in most of the animals of Group C, in the eruption of teeth. The animals in which administration was started early and continued longest showed normal development and eruption of the largest number of teeth. Animals which received 7 injections of parathormone did not show reduction of osteosclerosis in the tibia. However, masses of spindle cells were seen in place of hemopoietic cells. *Ia* rats which received 33 to 39 injections of parathormone showed the beginning of normal modeling resorption and considerable reduction of the osteosclerosis in the metaphyses and epiphyses of the tibia. The number of spindle cells diminished.

THE EFFECT OF ACTH AND CORTISONE ON THE SODIUM AND POTASSIUM LEVELS OF HUMAN SALIVA

Samuel Dreizen and others, p. 271.

ACTH and cortisone have been shown to influence the sodium and potassium levels of blood and urine in patients with adrenal cortical insufficiency. To determine whether a similar effect is exerted on the saliva, five patients with rheumatoid arthritis were selected. Two were injected intramuscularly with ACTH and three with cortisone. Samples of resting and stimulated saliva collected at 8:00 A.M. and 1:00 P.M. from each patient before, during and after treatment with ACTH or cortisone were tested for sodium and potassium by means of the flame photometer. It was observed that the repeated intramuscular injection of pituitary ACTH or synthetic cortisone is followed by definite changes in the concentration of sodium in the human saliva. The sodium level of resting and stimulated saliva declined within four hours after the beginning of injections in each of the five subjects.

The potassium concentration of the saliva was not materially altered after the injection of either of these hormones in any of the subjects, with the result that there was a decrease in the sodium:potassium ratio. The decrease in the sodium:potassium ratio was

greater in the samples of resting saliva than in the samples of stimulated saliva. This difference appears related to the difference in the rate of flow.

The potassium content greatly exceeded the sodium content in the samples of saliva before, during and after treatment with either ACTH or synthetic cortisone acetate. In every patient the potassium content of the saliva exceeded the normal blood serum or plasma value for this element. In contrast, the blood sodium content in each patient was approximately 3 to 15 times as great as the sodium concentration of the saliva.

The present studies show that saliva is not an ultrafiltrate of the blood. The secretory cells of human salivary glands possess the faculty of selecting and concentrating certain blood constituents in their elaboration of saliva, a process which is under hormonal as well as neural control.

AMMONIA PRODUCTION AND UREASE ACTIVITY IN SALIVA

R. M. Ballantyne, J. J. Rae and F. H. Lawford, p. 281.

A study of the ammonia-producing ability of the salivas of 68 dental students indicated that the ammonia-producing mechanism was unrelated to caries activity as measured by lactobacillus counts. Although urease is present in saliva, there was no direct relationship between urease content and the lactobacillus count. In all cases the presence of 2.5 per cent glucose stimulated the activity of salivary urease, but the relation between urease activity and ammonia production was not significant.

ALKALINE PHOSPHATASE IN THE JAW BONES AND TEETH OF THE ALBINO RAT AS RELATED TO ABNORMAL STATES OF BODY GROWTH, MINERAL METABOLISM, AND DEVELOPMENT

Anna Morse and Roy O. Greep, p. 284.

The histochemical distribution of alkaline phosphatase in the teeth and bones of the albino rat has been investigated in relation to abnormal states of body growth, mineral metabolism and development. The enzyme localization is unaffected by these diverse conditions, but the distribution pattern varies according to the morphological changes. Following hypophysectomy, phosphatase is noticeably decreased in amount in the synchondrosis of the condyle where there are fewer vesicular cells. An immediate increase in the number of cells in the vesicular zone follows subcutaneous injection of growth hormone. Concomitantly, the enzyme reaction increases. During rickets, the total phosphatase reaction is relatively greater than normal because of the increase in the positive osteoid and dentinoid tissue and in the vesicular cells of the condyle. In the *ia* rat, abnormal development is caused by a transitory failure in bone resorption. The defect results in overcrowding of the tooth germ with displacement of the odontogenic epithelium and ectopic formation of enamel, dentin and cementum. There is no apparent change in the enzyme content of the individual tissues although their arrangement may be exceedingly bizarre.

From the evidence presented, it can be concluded that at least some abnormal metabolic states affect the histochemical localization of phosphatase in the skull bones and teeth but only in so far as these states alter the amount of enzyme-positive tissues present.

SOLUBILITY OF ENAMEL ON AREAS OF KNOWN HARDNESS

Marjorie L. Swartz and Ralph W. Phillips, p. 293.

The hardness and solubility on identical areas of ground surfaces of enamel on a large number of teeth were measured. The enamel varied widely in hardness and solubility from tooth to tooth as well as from area to area on the same tooth. No correlation between hardness and solubility was detected. The calcium: phosphorus ratio of the enamel which dissolved out during the solubility tests was slightly higher than the 2:1 known to exist in enamel.

Deaths

Adair, Arthur D., Geneva, Ala.; Atlanta Dental College, 1897; died March 14; aged 78.

Ames, Walter F., Boston; Dental School, Tufts College, 1918; died March 12; aged 60.

Anderson, Charles E., Madrid, Iowa; College of Dentistry, Drake University, 1903; died March 23; aged 72.

Aubrey, Frank C., Maywood, Ill.; Chicago College of Dental Surgery, Loyola University, 1902; died February 22; aged 82.

Austin, Philip A., Manchester, N. H.; New York College of Dentistry, 1909; died March 6; aged 78.

Bailey, George W., Chicago; Dental School, Northwestern University, 1912; died March 3; aged 65.

Bartholomew, Arthur E., Millersburg, Ind.; Chicago College of Dental Surgery, Loyola University, 1899; died May 6.

Bergsieker, Harry E., St. Louis; School of Dentistry, Washington University, St. Louis, 1923; died March 20; aged 53.

Bibler, Marcus E., Elkhart, Kan.; Kansas City Dental College, 1919; died March 6; aged 58.

Blatchford, Benjamin M., Salem, Ore.; Chicago College of Dental Surgery, Loyola University, 1900; died April 1.

Brent, Thomas E., Laurel, Miss.; Atlanta Dental College, 1902; died April 2; aged 78.

Brown, Fred P., Haverhill, Mass.; died February 14.

Buehner, John B., Quincy, Ill.; American College of Dental Surgery, Chicago, 1895; died April 11; aged 83.

Butterfield, Louie W., Cedar Rapids, Iowa; Dental Department, George Washington University, 1910; died March 11; aged 72.

Case, Carl B., Milwaukee; Chicago College of Dental Surgery, Loyola University, 1899; died March 17; aged 75.

Chandler, Dean E., Atlanta, Ga.; Atlanta-Southern Dental College, 1923; died April 9; aged 54.

Chism, Matt H., Graham, Texas; died February 23; aged 97.

Crews, Robert W., Thomasville, N. C.; Baltimore College of Dental Surgery, University of Maryland, 1911; died February 17; aged 73.

Daly, John H., Beaumont, Texas; College of Dentistry, Baylor University, 1929; died February 14; aged 45.

Davenport, Lawrence J., Bronx, N. Y.; College of Dentistry, Howard University, 1914; died April 18; aged 68.

Davis, Don D., Washington, Iowa; College of Dentistry, University of Iowa, 1912; died March 22; aged 63.

Dolbee, Dora B., Muskegon, Mich.; died March 18; aged 73.

Dostrow, Victor G., Philadelphia; School of Dentistry, University of Pennsylvania, 1924; died April 15.

Dower, Jay H., Syracuse, N. Y.; School of Dentistry, University of Buffalo, 1897; died March 20; aged 77.

Dowling, W. Giles, Hyannis, Mass.; Dental School, Harvard University, 1898; died April 4; aged 81.

Drosd, Kasmier J., Aberdeen, Wash.; School of Dentistry, University of Denver, 1926; died April 7; aged 57.

Dudley, Edward R., Roanoke, Va.; died March 9; aged 70.

Edgington, Hugh R., Indianapolis; School of Dentistry, University of Louisville, 1918; died February 1; aged 61.

Evans, Carleton M., Springfield, Ohio; Central College of Dentistry, Indianapolis, 1901; died March 4; aged 76.

Falasca, Charles A., Warren, Ohio; College of Dentistry, Ohio State University, 1950; died April 3; aged 26.

Gabeka, Frederick T., Seattle, Wash.; Philadelphia Dental College, 1883; died April 8; aged 91.

Gaines, James B., Atlanta, Ga.; Atlanta-Southern Dental College, 1917; died March 24; aged 60.

Goalwin, Morris, New York; College of Dental and Oral Surgery, New York, 1916; died March 29; aged 66.

Godfrey, Joseph L., Buchanan, Mich.; Chicago College of Dental Surgery, Loyola University, 1905; died March 30; aged 73.

Green, Edwin R., Philadelphia; Philadelphia Dental College, 1890; died March 18; aged 87.

Green, William A., Altoona, Pa.; Pennsylvania College of Dental Surgery, Philadelphia, 1894; died March 17; aged 80.

Guth, Alfred R., Eagle River, Wis.; Dental School, Marquette University, 1924; died March 12; aged 52.

Hanna, George R., Los Angeles; School of Dentistry, University of Pennsylvania, 1900; died March 16; aged 77.

Hart, William G., Fairfield, Ill.; Faculty of Dentistry, University of Toronto, 1922; died February 5; aged 64.

Hecker, Jesse Z., Syracuse, N. Y.; School of Dentistry, Western Reserve University, 1938; died April 9; aged 42.

Hicks, Robert C., Lawndale, N. C.; Atlanta Dental College, 1912; died March 26; aged 66.

Hinkle, Edgar D., Lancaster, Pa.; School of Dentistry, University of Pennsylvania, 1902; died March 12; aged 79.

Hoag, Clarence W., Londonbridge, Va.; School of Dentistry, Medical College of Virginia, Richmond, 1915; died March 16.

Hoffmire, Everett L., Brooklyn; New York College of Dentistry, 1918; died March 20; aged 56.

Hood, Robert W., Monmouth, Ill.; Western Dental College, Kansas City, 1895; died April 7; aged 84.

Jaffe, Lawrence L., New Haven, Conn.; School of Dentistry, St. Louis University, 1917; died March 1; aged 57.

James, Austin F., Los Angeles; Chicago College of Dental Surgery, Loyola University, 1892; died April 13; aged 81.

Jenkins, Charles W., Knoxville, Tenn.; School of Dentistry, Vanderbilt University, 1926; died March 25; aged 50.

Jessen, Julius M., Ainsworth, Neb.; Omaha Dental College, 1900; died March 16; aged 78.

Johnson, Thomas M., Youngstown, Ohio; College of Dentistry, Ohio State University, 1923; died March 18.

Jones, Elmer E., Paris, Ill.; Indiana Dental College, 1886; died April 4; aged 88.

Jones, Harold P., Pasadena, Calif.; College of Dentistry, Creighton University, 1923; died April 10; aged 52.

Julien, Gordon G., Pueblo, Colo.; Dental School, Northwestern University, 1927; died April 19.

Kennedy, Owen M., Ambridge, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1899; died January 19; aged 76.

Kercheval, Leonard I., Houston, Texas; Indiana Dental College, 1912; died March 7; aged 62.

Kerwin, Joseph F., Chicago; Dental School, Northwestern University, 1920; died February 8.

Kimbrough, Henry S., St. Louis; School of Dentistry, Washington University, St. Louis, 1898; died April 19.

Kincaid, Robert C., Pelahatchie, Miss.; School of Dentistry, Tulane University, 1928; died February 26; aged 45.

King, Hubert L., Washington, D. C.; Dental Department, Columbian University, 1896; died March 25.

Kohn, Leonard, Brooklyn; New York College of Dentistry, 1912; died March 29; aged 62.

La Salle, Francis M., New Iberia, La.; School of Dentistry, Loyola University, New Orleans, 1932; died March 5; aged 45.

La Shelle, Eugene M., Pasadena, Calif.; College of Dentistry, University of Southern California, 1924; died May 4; aged 50.

Layman, Howard S., Springfield, Ill.; School of Dentistry, Washington University, St. Louis, 1911; died April 9; aged 63.

Lemoine, Arthur, Shreveport, La.; School of Dentistry, Tulane University, 1903; died March 28; aged 71.

Le Witter, Arnold, New York; Pennsylvania College of Dental Surgery, Philadelphia, 1907; died March 27; aged 79.

Lush, Frank A., San Diego, Calif.; died March 29.

MacLean, Archibald J., Stamford, Conn.; Dental Department, Baltimore Medical College, 1906; died April 5; aged 69.

Maypole, Alexander M., Maywood, Ill.; Chicago College of Dental Surgery, Loyola University, 1904; died February 2; aged 71.

McAllister, Donald B., Chicago; Kansas City-Western Dental College, 1938; died April 18; aged 43.

McHugh, Bernard, Sterling, Colo.; College of Dentistry, University of Nebraska, 1919; died April 15; aged 56.

McKibbin, Alexander L., Clarksburg, W. Va.; Baltimore College of Dental Surgery, 1910; died January 12; aged 66.

McKnight, Girvan T., Providence, R. I.; Dental School, Tufts College, 1923; died March 17; aged 53.

McManus, Leo J., Newark, N. J.; Pennsylvania College of Dental Surgery, Philadelphia, 1902; died March 20; aged 70.

McNelis, John A., Altoona, Pa.; School of Dentistry, University of Pittsburgh, 1926; died January 15; aged 54.

McWilliams, Hugh E., Philadelphia; School of Dentistry, University of Pennsylvania, 1911; died January 11; aged 68.

Miles, John I., Chicago; College of Dentistry, University of Illinois, 1911; died March 14.

Moore, George R., Ann Arbor, Mich.; College of Dental Surgery, University of Michigan, 1923; died April 6; aged 52.

Mullman, Joseph H., New York; College of Dentistry, New York University, 1905; died April 8.

Murphy, Daniel A., Fall River, Mass.; School of Dentistry, Georgetown University, 1907; died April 3.

Murphy, William J., Lawrence, Mass.; Dental Department, Baltimore Medical College, 1905; died January 1; aged 74.

Murphy, William M., Oakland, Calif.; died March 25.

Murray, Harry E., St. Paul; College of Dentistry, University of Minnesota, 1922; died January 13; aged 54.

Nelson, Carl A., Brockton, Mass.; School of Dentistry, University of Pennsylvania, 1903; died March 28.

Nelson, Joseph R., West Sunbury, Pa.; School of Dentistry, University of Pittsburgh, 1902; died March 2.

Noel, Leslie W., Nashville, Tenn.; School of Dentistry, Vanderbilt University, 1908; died April 11; aged 66.

Norris, Cicero E., Augusta, Ga.; Atlanta-Southern Dental College, 1906; died February 3; aged 70.

Nuckolls, James, San Francisco; College of Dentistry, University of California; 1927; died April 19; aged 49.

Nugent, Lawrence M., Altoona, Pa.; Pennsylvania College of Dental Surgery, Philadelphia, 1900; died April 13; aged 76.

O'Halloran, William, Weymouth, Mass.; Dental School, Tufts College, 1893; died April 1.

Oliver, Clyde L., Denton, Texas; College of Dentistry, Baylor University, 1919; died March 18; aged 61.

Owsiak, Francis X., Cleveland; School of Dentistry, Western Reserve University, 1917; died February 21; aged 67.

Perras, Eiffel A., Troy, N. Y.; School of Dentistry, University of Pennsylvania, 1913; died March 5; aged 62.

Peterson, Leonard L., Brooten, Minn.; College of Dentistry, University of Minnesota, 1928; died February 25; aged 51.

Reynolds, Elzy, Colfax, Ill.; College of Dental Surgery, Northwestern University, 1913; died February 9.

Richardson, Paul R., Des Moines, Iowa; College of Dentistry, University of Iowa, 1931; died March 14; aged 46.

Roberts, Oscar E., Jackson, Minn.; College of Dentistry, University of Minnesota; 1900; died March 29; aged 81.

Ross, Isidor P., Boston; Dental School, Tufts College, 1907; died April 12; aged 66.

Rzasa, Stanley A., Manchester, N. H.; Baltimore College of Dental Surgery, University of Maryland, 1935; died March 23; aged 43.

Sanders, Benjamin F., Pine Bluff, Ark.; College of Dentistry, University of Tennessee, 1949; died March 14; aged 33.

Schaer, Carl C., Belleville, Ill.; School of Dentistry, Washington University, St. Louis, 1898; died February 5; aged 71.

Schafhirt, William C., Washington, D. C.; Dental Department, Columbian University, 1887; died March 5; aged 86.

Schreiber, Edward J., Willimantic, Conn.; School of Dentistry, University of Louisville, 1919; died March 18; aged 56.

Seidner, Benjamin M., New York; College of Dentistry, New York University, 1936; died March 23; aged 43.

Shackelford, Allie S., San Antonio, Texas; Baltimore College of Dental Surgery, 1892; died February 5.

Snyder, Carl B., Cleveland; School of Dentistry, Western Reserve University, 1923; died April 10; aged 60.

Spencer, Norman C., Concord, Mass.; Dental School, Tufts College, 1908; died March 14; aged 65.

Stafford, Homer H., Youngstown, Ohio; died March 31.

Stannard, Joseph B., Bloomington, Ill.; School of Dentistry, University of Pennsylvania, 1897; died February 22.

Steirly, Francis R., Excelsior, Minn.; School of Dentistry, University of Louisville, 1889; died March 10; aged 89.

Stubbert, Frank B., Gibson City, Ill.; Dental School, Northwestern University, 1914; died February 12; aged 61.

Tewksbury, George A., Littleton, N. H.; Dental School, Tufts College, 1902; died March 22; aged 71.

Thiel, Herman F., Wautoma, Wis.; Dental Department, Milwaukee Medical College, 1905; died April 6; aged 72.

Thomas, Charles A., Arlington, Mass.; Dental School, Tufts College, 1904; died March 19; aged 77.

Toussaint, Gilbert J., Fort Atkinson, Wis.; Dental School, Marquette University, 1921; died February 12; aged 53.

Townsend, George R., Columbus, Ohio; College of Dentistry, Ohio State University, 1932; died February 19; aged 44.

Treuhaft, Leo, Cleveland; Indiana Dental College, 1923; died April 11; aged 57.

Warder, Lloyd E., Enid, Okla.; Keokuk Dental College, 1903; died March 9; aged 72.

Wardner, James F., Lackawanna, N. Y.; School of Dentistry, University of Buffalo, 1899; died March 3.

Weaver, Ellison B., Beacon, N. Y.; School of Dentistry, University of Pennsylvania, 1925; died March 27; aged 50.

Williams, Alfred J., Cleveland; Ohio College of Dental Surgery, University of Cincinnati, 1914; died March 21.

Ziegler, Lyman F., Bloomington, Ill.; Chicago College of Dental Surgery, Loyola University, 1908; died March 27.

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Third Annual Session	Sept. 8-11, 1952	St. Louis
Ninety-Fourth Annual Session	Sept. 28-Oct. 1, 1953	Cleveland
Ninety-Fifth Annual Session	Nov. 8-11, 1954	Miami

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 9-11, 1953	Montgomery	F. A. Finney, Jr.,	1045 Forrest Ave., Gadsden
Alaska			R. A. Smithson	Box 1293, Anchorage
Arizona			E. M. Scott	15 E. Monroe, Phoenix
Arkansas	Oct. 26-28	Little Rock	D. M. Hamm	White Bldg., Clarksville
California	Apr. 13-15, 1953	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	Apr. 20-22, 1953	Los Angeles	C. A. Moss	903 Crenshaw Blvd., Los Angeles
Colorado	Oct. 5-8	Colorado Springs	R. A. Downs	1422 Grant St., Denver
Connecticut			E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware	Jan. 14, 1953	Wilmington	J. J. Ficca	2130 Lancaster Ave., Wilmington
District of Columbia	Mar. 15-18, 1953	Washington	K. H. Wood	202-1835 Eye St., N. W. Washington
Florida	Apr. 19-22, 1953	St. Petersburg	C. T. Brown	602 Citizens Bldg., Tampa 2
Georgia	Oct. 12-15	Savannah	J. M. Heard, Jr.	803 Persons Bldg., Macon
Hawaii		Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu 17
Idaho			F. E. Carpenter	123 Main Ave., W., Twin Falls
Illinois	May 11-14, 1953	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana			E. E. Ewbank	Kingman
Iowa	May 4-6, 1953	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas			F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 7-9, 1953	Louisville	A. B. Coxwell	1976 Douglass Blvd., Louisville
Louisiana	Apr. 29-May 2, 1953	New Orleans	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 25-27, 1953	Rockland	S. Gower	Box 27, Skowhegan
Maryland			E. L. Pessagno, Jr.	415 Medical Arts Bldg., Baltimore 1
Massachusetts	May 3-6, 1953	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan			F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Feb. 23-25, 1953	Minneapolis	C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi		Jackson	H. M. Campbell	102 Professional Bldg., Tupelo
Missouri	May 10-13, 1953	Kansas City	R. R. Rhoades	201 Merchants Bank Bldg., Jefferson City
Montana	May 7-9, 1953	Missoula	C. S. Renouard	304 Phoenix Bldg., Butte
Nebraska	May, 1953	Lincoln	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada		Las Vegas	J. E. Ahlstrom	1150 Arizona, Boulder City
New Hampshire	June 11-14, 1953	Bretton Woods	F. E. Williams	814 Elm St., Manchester
New Jersey	April 22-24, 1953	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 24-27, 1953	Albuquerque	J. S. Eilar	Suite 7, Medical Arts Square, Albuquerque
New York	May 12-15, 1953	New York	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 17-20, 1953	Pinehurst	B. N. Walker	Liberty Life Bldg., Charlotte
North Dakota	May 24-27, 1953	Fargo	J. H. Lunday	302 Black Bldg., Fargo
Ohio	Nov. 9-12	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma			D. Robertson	434 N. W. 13th St., Oklahoma City
Oregon	Mar. 2-4, 1953	Portland	H. C. Fixott, Jr.	Medical Dental Bldg., Portland

State	Date	Place	Secretary	Address
Panama Canal Zone	Dec. 9		F. D. Buckley	Box 293, Rodman
Pennsylvania			M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	Jan. 1953		A. Quiñones	San German
Rhode Island			E. L. Bessette	1745 Broad St., Cranston 5
South Carolina	June, 1953	Greenville	J. R. Owings	7 Medical Court, Greenville
South Dakota	May, 1953	Rapid City	E. W. Elmen	Sioux Falls
Tennessee	May 11-14, 1953	Knoxville	W. L. McCulley	Brown Bldg., Cleveland
Texas	May 10-14, 1953	Houston	W. Ogle	3607 Gaston Ave., Dallas
Utah			K. L. Dedekind	914 Medical Arts Bldg., Salt Lake City
Vermont	May 17-19, 1953	Woodstock	W. J. Reardon	Rutland
Virginia			J. E. John	804 Medical Arts Bldg., Roanoke
Washington	June 18-20, 1953	Yakima	F. J. Dingler	1502 Medical-Dental Bldg., Seattle
West Virginia			A. B. Drake	508 West Virginia Bldg., Huntington 1
Wisconsin	Apr. 6-9, 1953	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming		Casper	T. J. Drew	State Capitol Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama			M. D. Edwards	132 Adams Ave., Montgomery
Alaska			J. H. Geyer	P. O. Box 915, Juneau
Arizona	Aug. 11-16	Florence	R. K. Trueblood	25 N. Second Ave., Glendale
Arkansas			H. O. Weatherly	205 Halter Bldg., Conway
California			K. I. Nesbitt	507 Polk St., San Francisco 2
Colorado			C. K. Phillips	724 Republic Bldg., Denver 2
Connecticut	Nov.	Bridgeport	C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia			W. M. Falls	1801 Eye St., N. W. Washington 6
Florida			A. W. Kellner	P. O. Box 155, Hollywood
Georgia			S. H. Yarbrough	Medical Arts Bldg., Columbus
Hawaii	Aug. 27-Sept. 1*	Honolulu	H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho			W. K. Adams	1624 Arlington, Caldwell
Illinois	Oct. 21-24	Chicago	W. A. McKee	503 Wood Bldg., Benton
Indiana	Nov. 17-20**	Indianapolis	C. A. Frech	504 Broadway, Gary
Iowa			H. M. Willits	719 Roshek Bldg., Dubuque
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky			R. I. Todd	Western Union Bldg., Richmond
Louisiana			A. R. de Nux	Marksville
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland	Nov.	Baltimore	H. Levin	3429 Park Heights Ave., Baltimore 15
Massachusetts			R. A. Barrette	Rm. 33 State House, Boston
Michigan	Jan. 26-30, 1953 June 8-12, 1953	Ann Arbor	J. L. Champagne	3714 W. McNichols Road, Detroit 21
Minnesota			F. A. Larson	1632 Washington St., N. E., Minneapolis
Mississippi			J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri			R. R. Rhoades	414 Central Trust Bldg., Jefferson City
Montana			V. J. Quinn	Box 865, Helena
Nebraska			H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada			G. C. Steinmiller	Suite 6, Masonic Temple, P. O. Box 2473, Reno
New Hampshire			D. J. Freese	4 Wall St., Concord
New Jersey	Dec. 8, 9**‡‡ Dec. 10-12§	Philadelphia Trenton	W. A. Wilson	150 E. State St., Trenton 8
New Mexico			J. J. Clarke, Sr.	Artesia
New York	Oct. 9, 10** Oct. 14-17§	New York Buffalo Buffalo Albany	D. W. Beier	23 S. Pearl St., Albany 7
North Carolina			F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota			A. B. Crabtree	Ellendale
Ohio	Oct. 27-31	Columbus	H. B. Smith	322 E. State St., Columbus
Oklahoma			J. B. Cole	706 Asp St., Norman
Oregon			F. L. Utter	506 Pioneer Trust Bldg., Salem
Pennsylvania			A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg

State	Date	Place	Secretary	Address
Puerto Rico	Sept.	Santurce	L. C. Coll	Box 9156, Santurce
Rhode Island	Nov. 25, 26	Providence	F. M. Hackett	267 Academy Ave., Providence
South Carolina			T. C. Sparks	1315 Pickens St., Columbia
South Dakota			O. Isaak	Tyndall
Tennessee	Dec. 10-15	Memphis	F. S. Maxey	804 Bennie Dillon Bldg., Nashville 3
Texas	Oct. 20, 21‡‡ Oct. 20-24†	Houston	R. T. Weber	312 Capital National Bank Bldg., Austin
Utah			M. W. Merrill	820 N. University Ave., Provo
Vermont			F. A. Reid	Windsor
Virginia	June 8, 9, 1953‡‡ June 8-12, 1953†	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond 19
Washington	Jan. 12, 1953	Seattle	J. B. Kiefer, Jr.	510 Cobb Bldg., Seattle
West Virginia			C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin			S. F. Donovan	Tomah
Wyoming			W. A. Hocker	212 O & S Bldg., Casper

*Dentistry and dental hygiene.
**Dental clinical examinations.
†Dental examinations.
‡Dental written examinations.
‡‡Hygienists' examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
American Academy of Dental Medicine	Dec. 7	New York	W. M. Greenhut Secy.	124 E. 84th St., New York 28
American Academy of Periodontology	Sept. 4-6	St. Louis	C. E. Chamberlain Secy.	115 North St., Peoria 5, Ill.
American Association of Dental Examiners	Sept. 5-6	St. Louis	C. A. Bumstead Secy.	924 Stuart Bldg., Lincoln, Neb.
American Association of Orthodontists, Central Section	Oct. 13, 14	Omaha	F. B. Lehman Secy.	1126 Merchants National Bank Bldg., Cedar Rapids, Iowa
American Board of Dental Public Health	Sept. 12, 13	St. Louis	P. E. Blackerby, Jr. Secy.	250 Champion St., Battle Creek, Mich.
American Board of Oral Pathology	Sept. 7	St. Louis	J. L. Bernier Secy.	Army Institute of Pathology, Washington, D. C.
American Board of Oral Surgery	Oct. 5-8	New Orleans	L. M. FitzGerald Secy.	718 Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 22-26, 1953	Dallas, Texas	C. E. Martinek Secy.	661 Fisher Bldg., Detroit 2
American Board of Pedodontics	Aug. 4-7	San Francisco	R. L. Ireland Secy.	College of Dentistry, University of Nebraska, Lincoln, Neb.
American Board of Prosthodontics	Feb. 1-7, 1953	Indianapolis	I. R. Hardy Secy.	Tufts College Dental School, 136 Harrison Ave., Boston 11
American College of Dentists	Sept. 7	St. Louis	O. W. Brandhorst Secy.	4952 Maryland Ave., St. Louis 8
American Dental Assistants Association	Sept. 8-11	St. Louis	M. L. Martin Exec. Secy.	410 First National Bank Bldg., La Porte, Ind.
American Denture Society	Sept. 5, 6	St. Louis	A. L. Roberts Secy.	Aurora National Bank Bldg., Aurora, Ill.
American Public Health Association	Oct. 20-24	Cleveland	R. M. Atwater Exec. Secy.	1790 Broadway, New York 19
American Society for the Advancement of General Anesthesia in Dentistry	Oct. 27	New York	M. H. Feldman Exec. Secy.	750 Fifth Ave., New York
American Society of Oral Surgeons	Oct. 8-11	New Orleans	R. F. Whalen Exec. Secy.	1112 E. Clay St., Richmond, Va.
Chicago Dental Society	Feb. 8-11, 1953	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago 2

Name	Date	Place	Secy. or Chm.	Address
Council on Dental Education, Dental Aptitude Tests	Oct. 24, 25		S. Peterson Secy.	222 E. Superior St., Chicago 11
Dallas Mid-Winter Dental Clinic	Jan. 25-28, 1953	Dallas, Texas	W. C. McCaskill, Jr. Gen. Chm.	1329 Medical Arts Bldg., Dallas, Texas
Great Lakes Society of Oral Surgeons	Sept. 21	Cleveland	B. B. Cook Secy.	10314 Puritan Ave., Detroit 21
Greater New York Dental Meeting	Dec. 8-12	New York	A. E. Corby Chm.	Hotel Statler, Room 106A, New York
International Academy of Anesthesiology	Oct. 15	New York	I. G. Tomack Exec. Secy.	355 E. 149th St., New York 55
International Association for Dental Research	Mar. 20-22, 1953	Philadelphia	E. H. Hatton Secy.	311 E. Chicago Ave., Chicago 11
National Board of Dental Examiners	Dec. 1, 2		S. Peterson Secy.	222 E. Superior St., Chicago 11
New England Dental Society	Oct. 1, 2	Boston	A. R. Wilson Secy.	43 Farmington Ave., Hartford, Conn.
New Orleans Dental Conference	Nov. 9-12	New Orleans	M. R. Matta Secy.	629 Maison Blanche Bldg., New Orleans
Northeastern Society of Orthodontists	Nov. 10, 11	Montreal, Canada	O. Jacobson Secy.	35 W. 81st St., New York
Odontological Society of Western Pennsylvania	Nov. 11-13	Pittsburgh	W. E. Craig Secy.	206 Jenkins Bldg., Pittsburgh 22
Southeastern Society of Oral Surgeons	Mar. 6, 7, 1953	Birmingham, Ala.	C. F. Landeis Secy.	316 James Bldg., Chattanooga, Tenn.
Southern Society of Orthodontists	Aug. 10-13	Asheville, N. C.	F. P. Bowyer Secy.	608 Medical Arts Bldg., Knoxville, Tenn.
Southwestern Society of Orthodontists	Oct. 26-29	San Antonio, Texas	F. A. Boyd Secy.	1502 N. Third, Abilene, Texas

ANNOUNCING . . .

A Group Accident and Health Insurance Program which will be available to members of the American Dental Association on September first.

The Plan has been approved by the Council on Insurance and accepted by the Board of Trustees of your Association.

It is being underwritten by the National Casualty Company of Detroit and will be offered at premium savings of 35% to 50% (depending on age) as compared to individual policies. Coverage will be obtainable in amounts of $100.00, $200.00, $300.00 and $400.00 per month, including $3,000.00 Accidental Death Benefit. Impaired risks will be accepted during this initial enrollment period only up to a maximum of $200.00 monthly on qualification of 50% of our membership.

Presentation of this Association Program is not intended to displace existing state or local Society plans, but to supplement other coverages already in force.

This proposal is being offered in all states and territories with the exception of California, Nevada, New Jersey, New York and Utah, where the National Casualty Company plans are already in existence.

Complete details will be mailed to all members on September first.

Address all communications to the Insurance Trustee.

DR. PAUL W. ZILLMANN
#29 Walden Avenue, Buffalo 11, N. Y.

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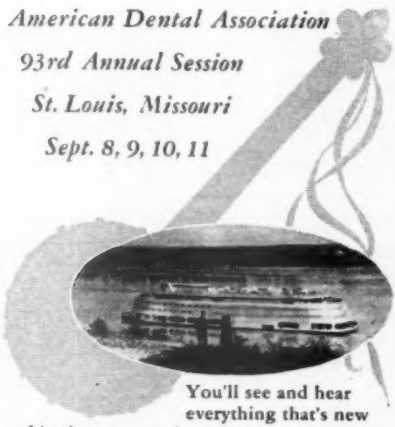
American Dental Association

93rd Annual Session

St. Louis, Missouri

Sept. 8, 9, 10, 11



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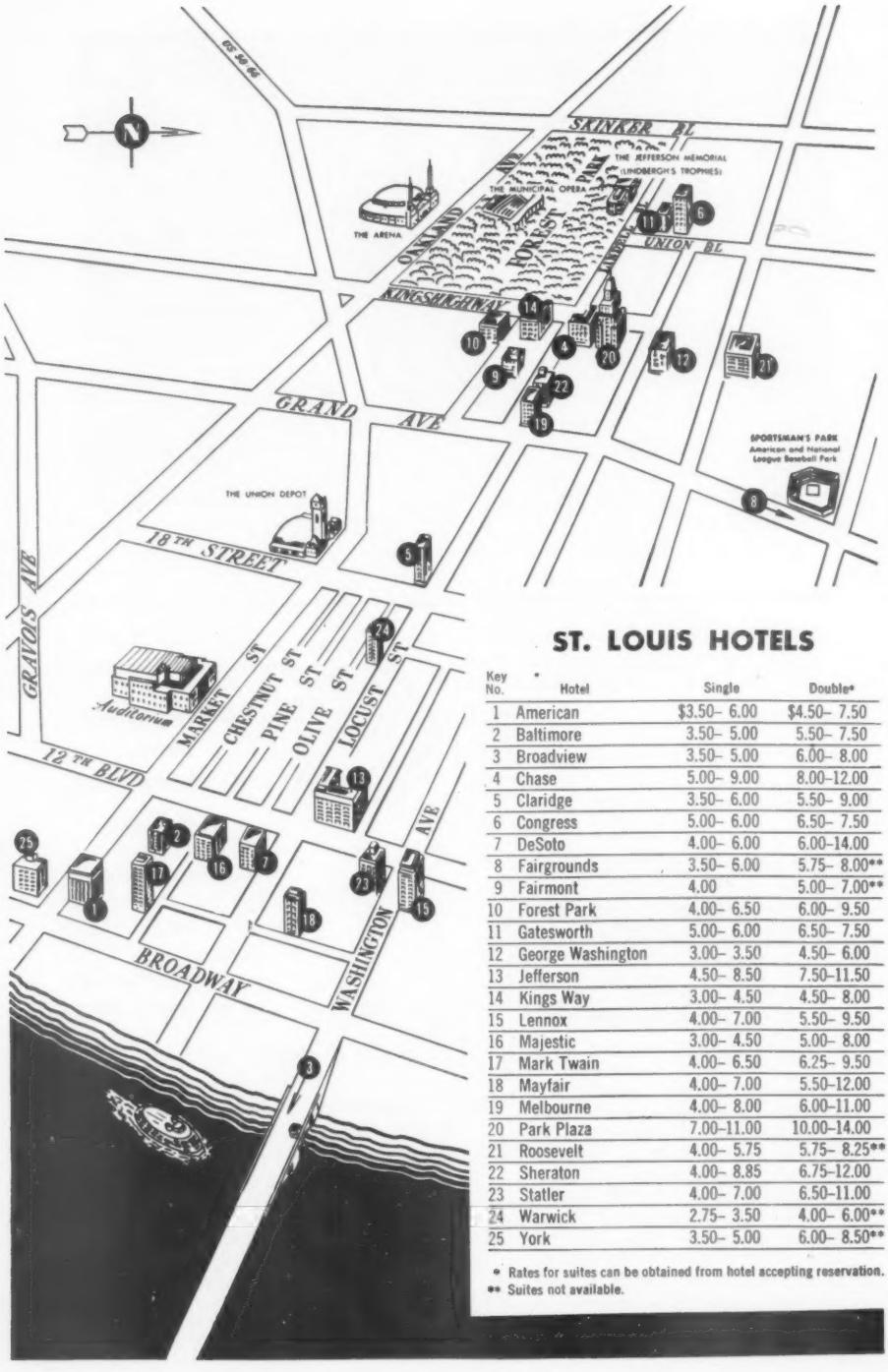

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2	Baltimore	3.50– 5.00	5.50– 7.50
3	Broadview	3.50– 5.00	6.00– 8.00
4	Chase	5.00– 9.00	8.00–12.00
5	Claridge	3.50– 6.00	5.50– 9.00
6	Congress	5.00– 6.00	6.50– 7.50
7	DeSoto	4.00– 6.00	6.00–14.00
8	Fairgrounds	3.50– 6.00	5.75– 8.00**
9	Fairmont	4.00	5.00– 7.00**
10	Forest Park	4.00– 6.50	6.00– 9.50
11	Gatesworth	5.00– 6.00	6.50– 7.50
12	George Washington	3.00– 3.50	4.50– 6.00
13	Jefferson	4.50– 8.50	7.50–11.50
14	Kings Way	3.00– 4.50	4.50– 8.00
15	Lennox	4.00– 7.00	5.50– 9.50
16	Majestic	3.00– 4.50	5.00– 8.00
17	Mark Twain	4.00– 6.50	6.25– 9.50
18	Mayfair	4.00– 7.00	5.50–12.00
19	Melbourne	4.00– 8.00	6.00–11.00
20	Park Plaza	7.00–11.00	10.00–14.00
21	Roosevelt	4.00– 5.75	5.75– 8.25**
22	Sheraton	4.00– 8.85	6.75–12.00
23	Statler	4.00– 7.00	6.50–11.00
24	Warwick	2.75– 3.50	4.00– 6.00**
25	York	3.50– 5.00	6.00– 8.50**

* Rates for suites can be obtained from hotel accepting reservation.
** Suites not available.

Hotel Reservation Application . . .

93rd Annual Session
American Dental Association
September 8-11, 1952
St. Louis, Missouri

A. D. A. HOUSING BUREAU

911 Locust Street, Room 406, St. Louis 1, Missouri

INSTRUCTIONS:

Reservations for hotel accommodations may be secured by completing this application and mailing it to: A.D.A. Housing Bureau, 911 Locust Street, Room 406, St. Louis 1, Missouri.

Be sure to indicate your arrival time in St. Louis. Reservations will be held only until 6 p.m. of the day you indicate when you will arrive in St. Louis. Failure to notify the hotel of any last minute change in your arrival time may result in cancellation of the reservation.

Names of all persons who intend to occupy the accommodations must be listed on the application.

List four choices of hotels.

Confirmation will be sent indicating which hotel has accepted the reservation.

Write the A.D.A. Housing Bureau in St. Louis if you wish to cancel the reservation or make any change in your reservation and NOT the hotel to which you were assigned.

(Please print or type) A.D.A.

Applicant:

Name_____

(Street address) (City) (Zone) (State)

Arrival in St. Louis_____ a.m. p.m. Leaving_____

Accommodations:

Hotel_____ (First choice) Hotel_____ (Third choice)

Hotel_____ (Second choice) Hotel_____ (Fourth choice)

☐ Single occupancy, rate to range from $_____ to $_____ per day.

☐ Double occupancy, double bed, rate to range from $_____ to $_____ per day. } 2 names must be listed below

☐ Double occupancy, twin beds, rate to range from $_____ to $_____ per day. }

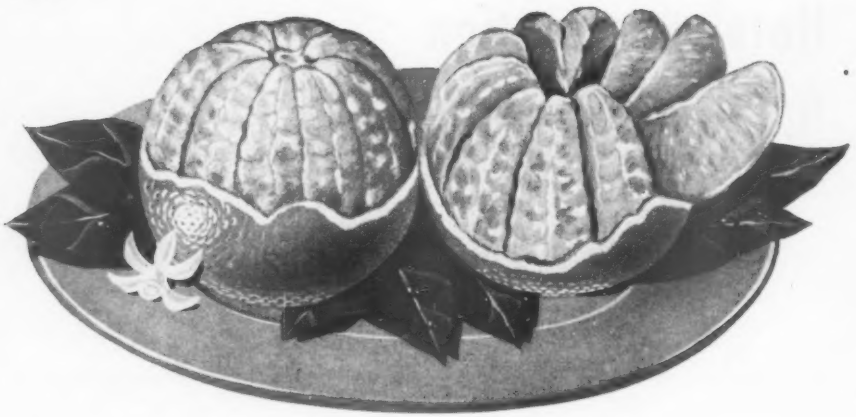
☐ Suite of_____ rooms, including parlor, rate to range from $_____ to $_____ per day.

Occupants: (use an extra page for listing additional names if necessary)

Room will be occupied by:

(Name) (Address) (City) (State)

(Name) (Address) (City) (State)



An Orange a Day for Better Nutrient Absorption

THE SIGNIFICANCE OF THE PROTOPECTINS

Human nutrition today means more than the mere ingestion of the chemical components of foodstuffs. While these nutrients—vitamins, minerals, proteins, fats, and carbohydrates—are needed to carry on metabolic life, food must also provide other substances required for normal functioning of many systems within the organism, particularly the gastrointestinal tract. Conversely, only in the optimally functioning digestive tract will released nutrients be absorbed to the greatest possible extent.

The Protopectins

Among such non-nutritive substances which aid in promoting better intestinal functioning are the protopectins, the subject of the present wide interest in complex carbohydrates.

Protopectins are the native form in which pectin occurs in certain fruits. California oranges supply generous amounts of these complex carbohydrates, which in the edible portion are contained in the fibrovascular bundles, the segmental walls, and the juice sacs; the juice contains comparatively little.

When the properly peeled fruit is eaten whole, the ingested protopectins—after conversion to pectin and subjection to enzymatic and bacterial action throughout the tract—yield substances largely responsible for their advantageous influence on intestinal function and nutrient absorption.

Improved Absorption of Nutrients

By lowering intestinal pH and lessening intestinal fermentation and putrefaction, the protopectins create an environment conducive to more complete absorption of important nutrients supplied by the daily diet. In this manner, absorption of non-caloric nutrients such as vitamins and minerals is enhanced, ***without leading to weight gain.*** The influence of the protopectins, of value at every age, is especially beneficial in the later years of life.

Other Benefits

Because of their demulcent influence the protopectins counteract the effects of intestinal irritants, thus aiding in the prevention of diarrhea. Through their water-binding power they lead to the formation of desirable gelatinous bulk which stimulates peristalsis and tends to prevent constipation. By lowering the intestinal pH, the protopectins tend to inhibit the growth of putrefactive and otherwise undesirable microorganisms present in the intestine.

These beneficial effects are over and above, and entirely separate from, the multiple vitamin values of oranges. Oranges remain the best practical source of vitamin C. Sunkist Oranges are the finest of the crop of California, where sunshine, mineral-rich soil, and cool nights combine to produce oranges of the highest quality.

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(1) Supporting bibliography of references to nearly 100 original papers sent to physicians and dentists on request addressed to:

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PRACTICES AND OFFICES FOR SALE

CALIFORNIA—Successful select, active practice well located in Los Angeles, established 30 years. Reasonable rent, everything for modern, qualified dentist: used inventory about $5000; owner has other interests. Available about August 1st; might stay a few weeks to introduce right man. Direct replies to Room 203, 3200 West 6th Street, Los Angeles 5, California.

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CALIFORNIA—Well established practice in Southern California town. Excellent earning capacity, good opportunity for recent graduate. Only dentist for over 5,000 people. Very enjoyable living conditions; swimming, hunting, fishing, ideal climate. Direct replies to Mrs. L. F. Parker, 6919 Magnolia Avenue, Riverside, California.

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CALIFORNIA—Los Angeles, long established completely equipped three chair office and laboratory. Contract with company of five thousand employees goes in purchase. Semi-retiring to small community. Direct replies to Dr. Ben A. Patton 826 Pacific Electric Bldg., Los Angeles 14, California.

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FLORIDA—Seacoast city population 10,000. Established general practice for sale. Office extremely well-equipped. Owner specializing, write giving qualifications and special interest in dentistry. Address A.D.A. Box No. 82.

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FLORIDA—Well established dental practice with fine clientele. Ultra modern two chair office beautifully furnished with x-ray, lab, business office and reception room. New Ritter equipment. Best location in Miami. Address A.D.A. Box No. 70.

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ILLINOIS—Dental office in central Illinois city of 40,000. Excellent location: for sale with or without equipment. Address A.D.A. Box No. 17.

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IOWA—For sale due to death: sole local dental practice, complete 2 chair office, 8 room house on easy terms. Town near Clinton. Direct replies to Art Henningsen, Realtor, Weston Bldg., Clinton, Iowa.

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MASSACHUSETTS—Dentist office-store available in new mercantile building. Excellent opportunity for dentist to establish his practice in Amherst, Massachusetts, a two-college town. Direct replies to G. F. Hogan, M.D., 26 Sunset Avenue, Amherst, Massachusetts.

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MICHIGAN—Office and Home combination for sale, completely furnished, modern, oil heat, 3 bedrooms, good practice, Northern Michigan—lower peninsula, good hunting and fishing. Address A.D.A. Box No. 94.

MICHIGAN—Dental practice grossing $30,000 yearly located in lovely southwestern Michigan town. Two chair office with modern Ritter equipment value approximately $11,000. Dentist wants to move to another climate and asks $15,000 for practice and equipment. Address A.D.A. Box No. 95.

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MISSOURI—For sale due to death, fully equipped office and long established practice. Fine opportunity, one other dentist in town. Reasonably priced. Direct replies to Mrs. C. A. Noland, Monroe City, Missouri.

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MISSOURI—For sale in Richland, Missouri, well established office and practice, town of 1200 in center of thriving Ozark community, live stock, poultry and grain farming. Near Fort Wood and also located near the International shoe factory. Direct replies to D. D. Solveter, Executor, Dr. J. A. Simmons Estate, Bank of Crocker, Crocker, Missouri.

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NEW JERSEY—Fully equipped office in south Jersey town of 8,000. Large population, rapidly growing town. Gross about $30,000 annually. Owner going into specialty work. Address A.D.A. Box No. 96.

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NEW YORK—Eastern Long Island. Substantial ten room home for sale 2½ baths, automatic heat, slate roof, double garage; eight room bungalow office building, two chairs, Ritter equipped. Practice, long established. Price thirty-seven thousand, half cash, balance twenty-five years. Serious inquiries only. Address A.D.A. Box No. 68.

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NEW YORK—Long established two chair office for sale, owner moving because of health. Will stay for short period on percentage basis to introduce patients. Office situated in Valley Stream, Long Island, New York. Address A.D.A. Box No. 97.

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PENNSYLVANIA—Completely equipped modern one chair dental office, x-ray, laboratory, reception room. Owner deceased. Established for 23 years, producing good income. Near two physicians. No other dentist in this suburban residential district of Johnstown, Pennsylvania. Modern brick living quarters included. Terms. Direct replies to C. B. Buck, 399 Columbia Street, Berkeley Hill, Johnstown, Pennsylvania, Phone 337871.

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WEST VIRGINIA—City practice for market value of equipment. Equipment 20 years old and valued at approximately $1,000.00. Address A.D.A. Box No. 98.

●

WEST VIRGINIA—New Ritter equipped dental office for sale or for rent. Located in south eastern part of state. Large trade area. Owner drafted. Address A.D.A. Box No. 99.

WISCONSIN—Milwaukee—2 chair office, new equipment, newly decorated, rent only $40.00 per month. Gross $2,000 monthly. For sale at $5,000 cash, can be financed. Direct replies to Dr. M. J. Thompson, 7041 W. Greenfield, Milwaukee, Wisconsin.

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WISCONSIN—Northern Wisconsin resort city of two thousand population. Two chair office and home. Only dentist in the city and large drawing community. Gross seventeen thousand cash. Direct replies to Dr. L. A. Ison, Crandon, Wisconsin.

LOCATIONS AVAILABLE

CALIFORNIA—Established dental office for lease, dentist drafted. Lucrative practice. Pacific beach (San Diego). Reasonable rent. Individual professional building with parking. Modern spacious. Direct replies to George Ury, 628 National Avenue, National City, California.

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FLORIDA—Dental office for rent, in fast growing city. Electrical wiring, plumbing fixtures, all installed. Rent $150.00 per month. Direct replies to: Dr. J. A. Howard, 309 S.E. 25th Avenue, Fort Lauderdale, Florida.

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INDIANA—Dental office for rent in fast growing city of 6,000 with only one dentist. Excellent opportunity. Recently vacated. In heart of business district with parking facilities. Reasonable rent with lease. Direct replies to: Meister's Drug Store, East Gary, Indiana.

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TEXAS—For rent or lease, New modern dental office between Bedias and Madisonville, Texas. Good rural area. Excellent opportunity to take over practice of one deceased. Fully equipped, two chairs, x-ray. Direct replies to: Mrs. Grady Harrison, Bedias, Texas.

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VIRGINIA—Arlington—Main highway unusual location—office and home—private parking lot—one of three operating rooms equipped plus x-ray—will stay and introduce patients. Direct replies to: Dr. C. E. Byers, 4300 Columbia Park, Arlington, Virginia.

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CALIFORNIA—Pedodontist: California licensed to join dental group. Should be board certified or eligible. Early partnership available. Direct replies to: Dr. Howard Jan, 3451 Piedmont Avenue, Oakland, California.

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MASSACHUSETTS—Excellent opportunity for capable young orthodontist: association leading to purchase of established orthodontic practice. Write details, education and experience, in your own handwriting. Address A.D.A. Box No. 100.

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NEW YORK—Young man wanted for general practice in upstate office. Best equipment. Must be draft exempt. State age, experience, and income needed at start. Address A.D.A. Box No. 88.

NEW YORK—Permanent association open with orthodontist in New York. State experience or training in reply. Will train capable recent graduate. Address A.D.A. Box No. 101.

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DENTIST—Pennsylvania—would like to change location. Would you be interested in an assistant: a good all round technician. Post graduate certificate for airbrasive 'airdent' operation from Georgetown University. Pennsylvania License, Address A.D.A. Box No. 93.

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DENTIST—General practitioner, age 36, available October 1st, desires to purchase location, or associate with dentist contemplating retirement in New York or Illinois. Excellent background with references furnished. Address A.D.A. Box No. 102.

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DENTIST—To be released from service February, desires home-office in small community near Philadelphia or West Chester, Pennsylvania. Hopes to buy from retiring dentist or rent with option to buy. Address A.D.A. Box No. 103.

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PROSTHODONTIST—Would like teaching position in prosthetics or association with dentist where work will be limited to partial or complete denture prosthesis. Address A.D.A. Box No. 104.

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DENTIST—1947 graduate—would like to associate with or purchase general practice or obtain suitable location for individual practice in midwest or New York state. Completing 21 months of army service. Address A.D.A. Box No. 105.

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DENTIST—General practitioner, age 43 desires clinical position or association with definite income. A.B., D.D.S., degrees. Have Conecticut license. Experienced in clinical work and private practice. Draft exempt. Address A.D.A. Box No. 106.

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DENTIST—1948 graduate, one year surgery internship, one year pedodontics, excellent gold training, now completing two years Naval duty, desires foreign employment: Europe, South America or Japan. Address A.D.A. Box No. 107.

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DENTIST—City weary, young, with family, well trained, hospital, surgery, ethical practice for six years, licensed New York state, seeks suburban or rural practice. Open to reasonable proposition. Address A.D.A. Box No. 108.

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DENTIST—Tufts graduate 'Cum Laude' 1951. Attending Columbia Post-Graduate course in orthodontics completed in December. New York, New Jersey license and national boards. Draft exempt. Desires permanent association with future interest of purchase. Address A.D.A. Box No. 109.

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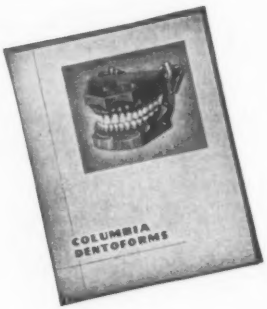

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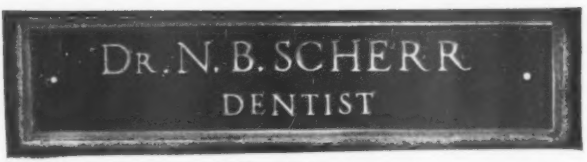

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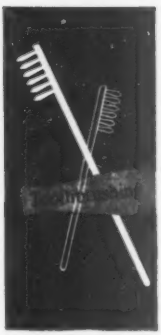

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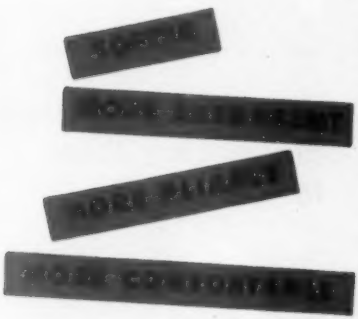

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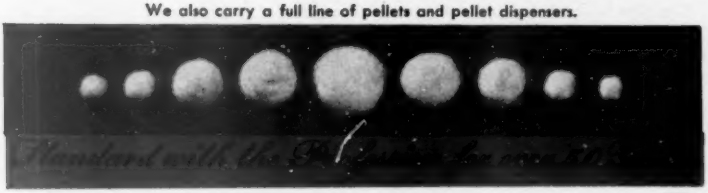

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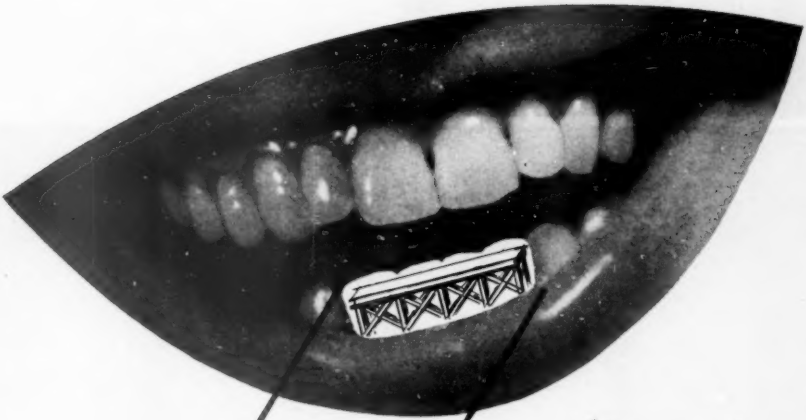

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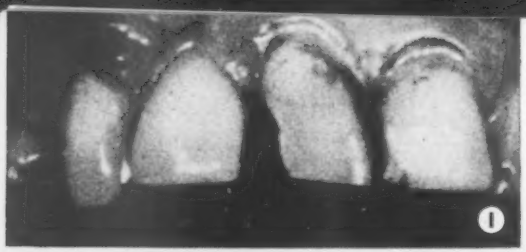

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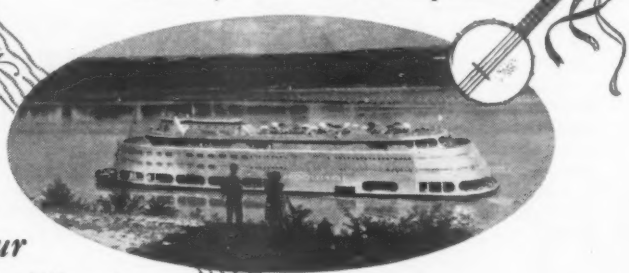

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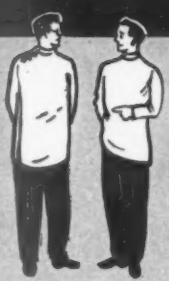

— which, by warming the powder compensates for volume loss during polymerization . . .

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The major purpose of the Non-Pressure Compensating Brush Technique* is to compensate for volume loss during polymerization! Only FASTCROWN, of all the fine particle size filling plastics, is suitable for the *true* Non-Pressure Compensating Technique.* Compensation is obtained by inserting a small bead of the material, inducing it to cure as rapidly as possible, undergoing its loss of volume. When the next bead is added, it compensates for the loss of the first portion and then, in turn, polymerizes. *Compensation for shrinkage is commensurate with the degree of polymerization attained in the first portion before the second is inserted.* The *true* Compensating Technique* used with FASTCROWN provides this maximum polymerization.

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*Developed by Frank H. Nealon

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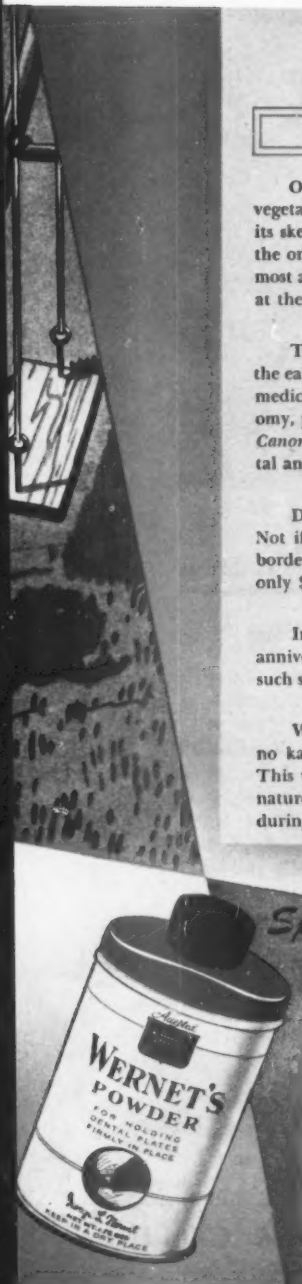

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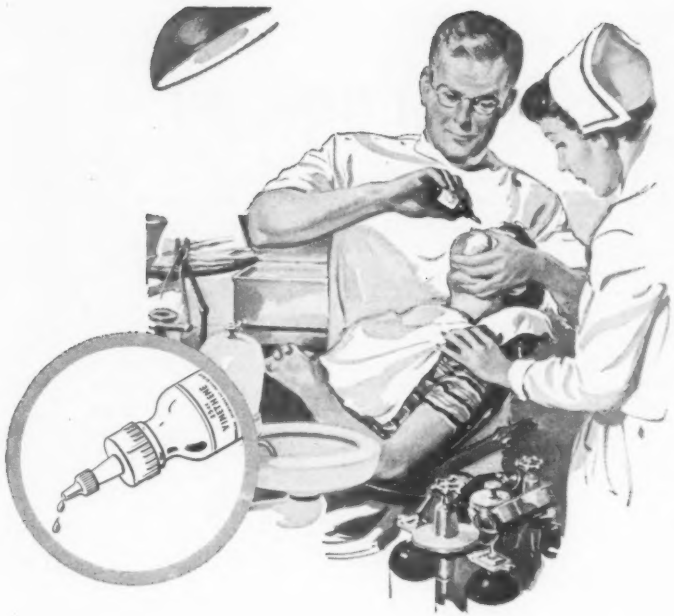

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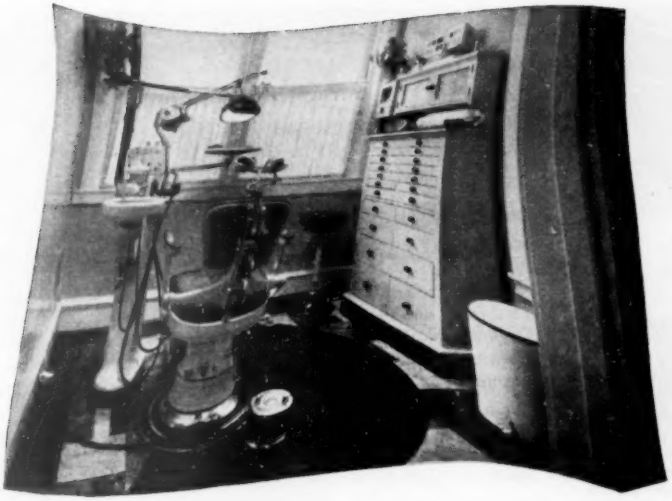

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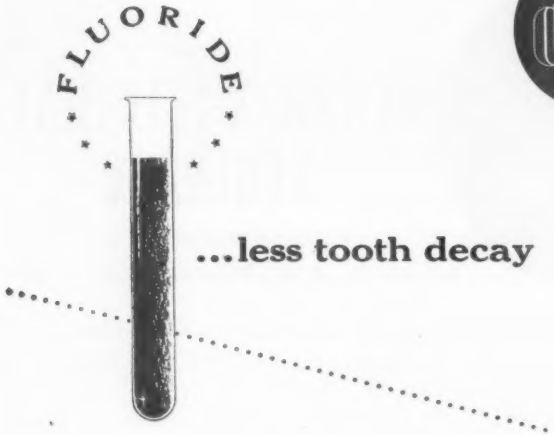

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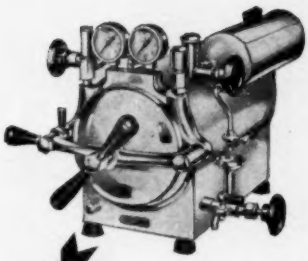

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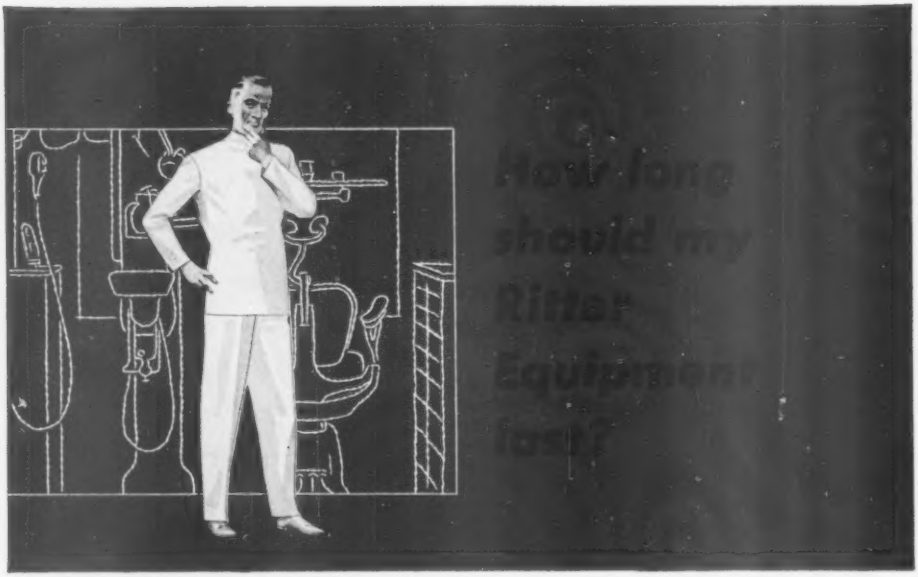

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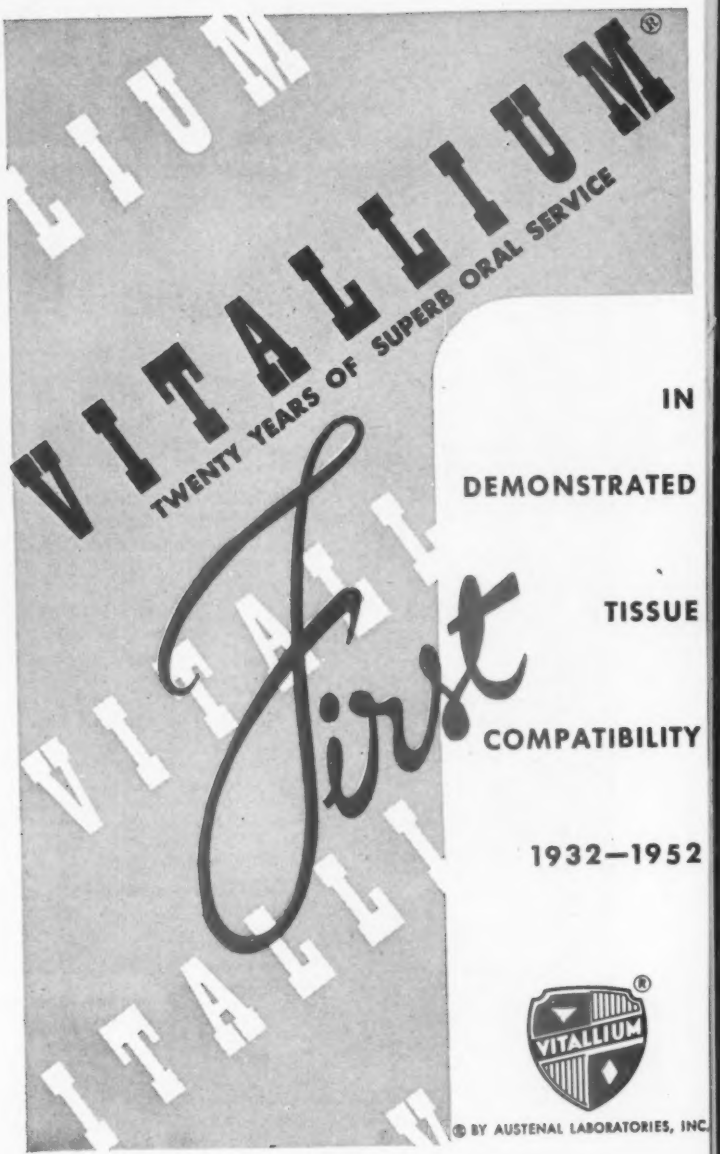
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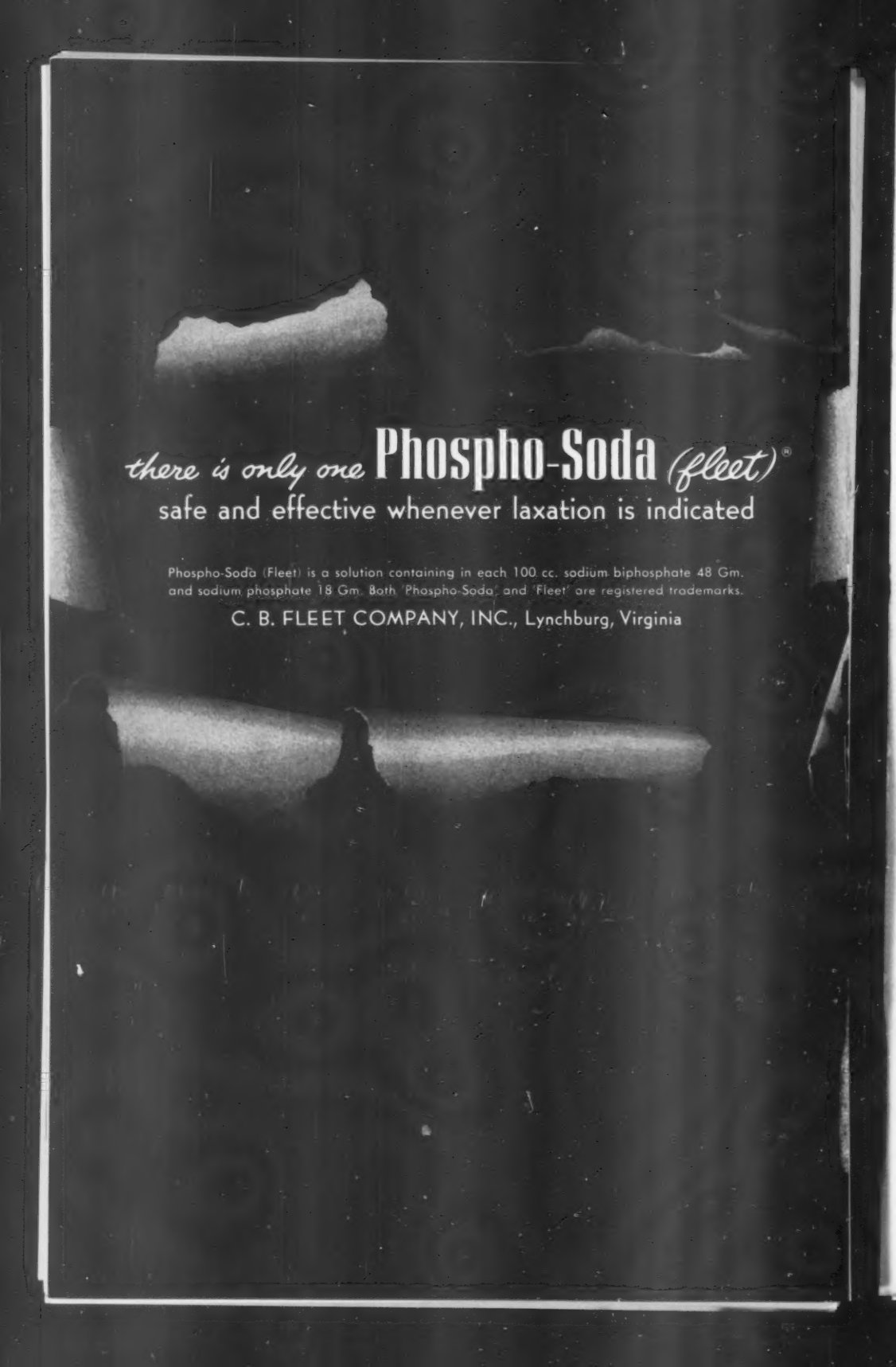
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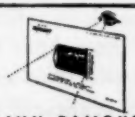

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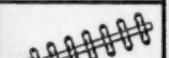

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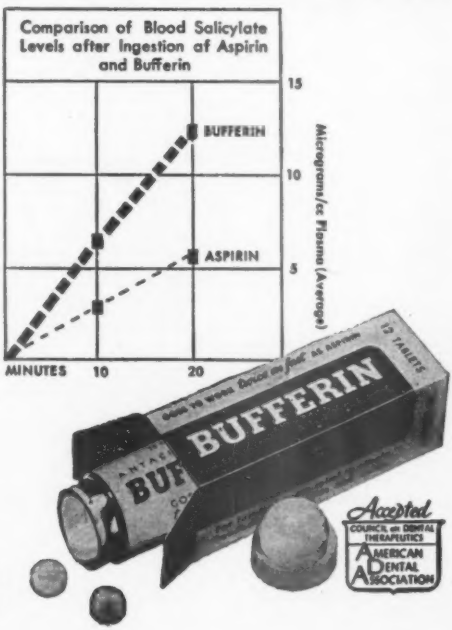

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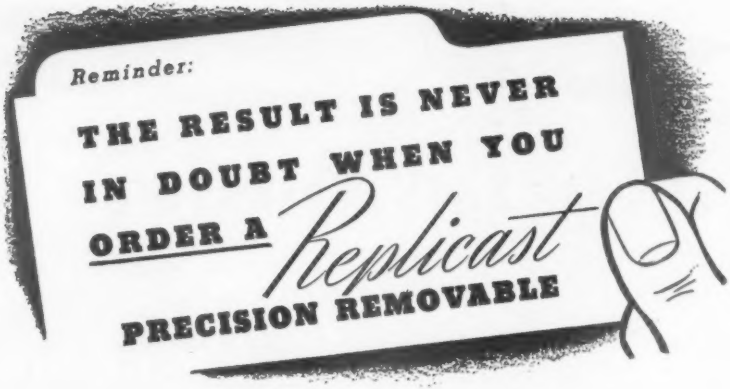

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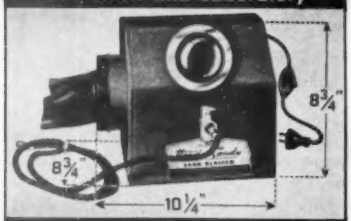

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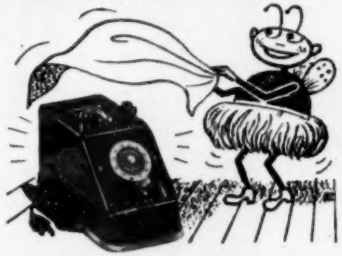

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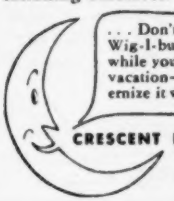

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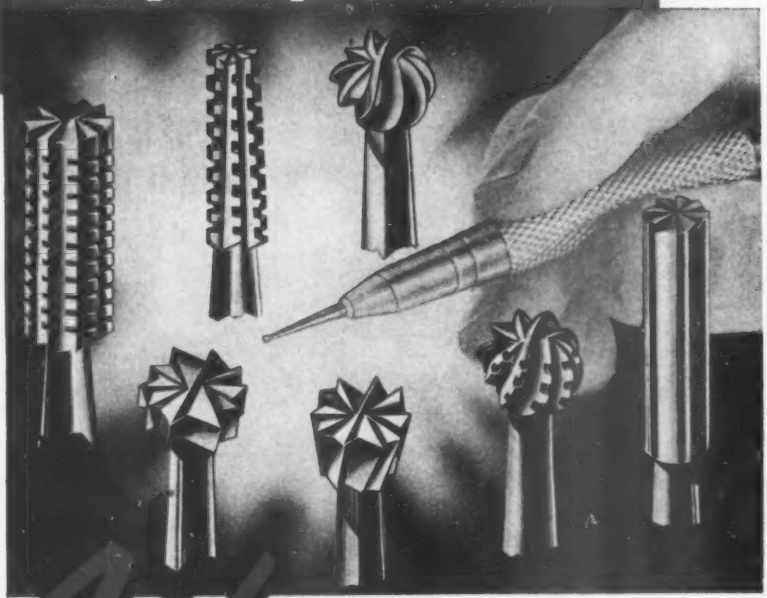

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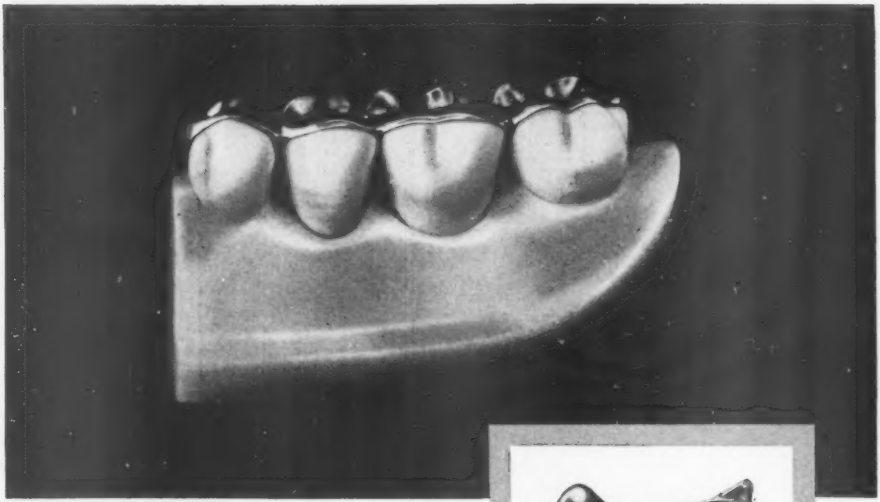

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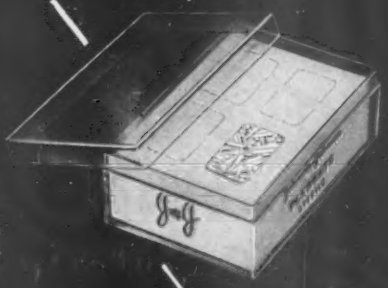

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